2015 Upper Extremity MMI and Impairment Rating

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Please sign in for Friday Morning

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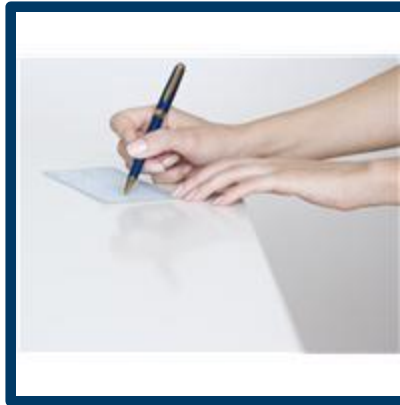
Disclaimer

The videos presented in this training are made available by the Texas Department of Insurance/Division of Workers' Compensation (TDI-TWC) for educational purposes only. The videos are not intended to represent the only method or procedure appropriate for the medical situation discussed. Rather, they are intended to present an approach, method, or procedure that faculty could have utilized in the presented medical situations, which may be helpful to others who face similar situations.

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MMI/IR – Upper Extremity Case 1

History of Injury

25 y.o. male was working as a tractor driver 3 months ago and was loading a pallet when another tractor smashed him against a wall. He sustained crush injuries to his right wrist and right upper arm. He had severe pain and loss of function in the wrist and shoulder.

MMI/IR - Upper Extremity Case 1

Treatment History

- He was seen at the ER for open wounds and fractures of the right wrist and humerus.

- He underwent debridement of the wounds and open reduction of the fractures.

- He was discharged from the hospital 3 days later after IV meds and told to follow up with an orthopedic surgeon.

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MMI/IR - Upper Extremity Case 1

Treatment History

- The company sent him the next day to an occupational medicine clinic for evaluation.

- He was placed on restricted duty.

- There is no "light duty," employer advised "Come back when you are 100%."

- The occupational medicine physician followed him while he was in a cast.

- Six weeks later he saw an orthopedic surgeon.

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MMI/IR – Upper Extremity Case 1

Treatment History

- The ortho removed the cast, and x-rays showed healed fractures. The ortho refers him for PT.

- Placed on restricted duty work "No use of right arm."

- There is no "light duty," so he is told to stay home.

- After 3 weeks of PT (9 sessions), the insurance company denies additional PT and submits a DWC Form-032 requesting a DD exam for MMI & IR.

- The insurance adjustor says he "has healed" and is at MMI.

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MMI/IR - Upper Extremity Case 1

Designated Doctor examination - 4 months post injury

Medical history:

- He states he cannot use his right arm well at all, especially above shoulder level .

- It is "really weak."

- His right shoulder and wrist are "stiff."

- He has no complaints of pain.

- The PT helped, but he has not had any PT in about 3 weeks - he is doing it a home.

- He says he wants to work, "but my boss won't let me."

MMI/IR - Upper Extremity Case 1

Designated Doctor Physical examination:

• X-rays (UE) - fractures healed, hardware in good position

• Shoulder flexion 80°, extension 20°, Adduction 20°, abduction 80°, IR 10°, ER 40°

• Wrist flexion 20°, extension 20°, radial deviation 10°, ulnar deviation 10°

• Elbow/forearm pronation 40°, supination 40°

• Major weakness in multiple planes, wrist and shoulder.

MMI/IR - Upper Extremity Case 1

Designated Doctor Physical Examination

- Based on the medical records and your physical examination of the injured employee, what is the compensable injury for certifying MMI and IR?

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Maximum Medical Improvement Upper Extremity Case 1

Log onto ODG
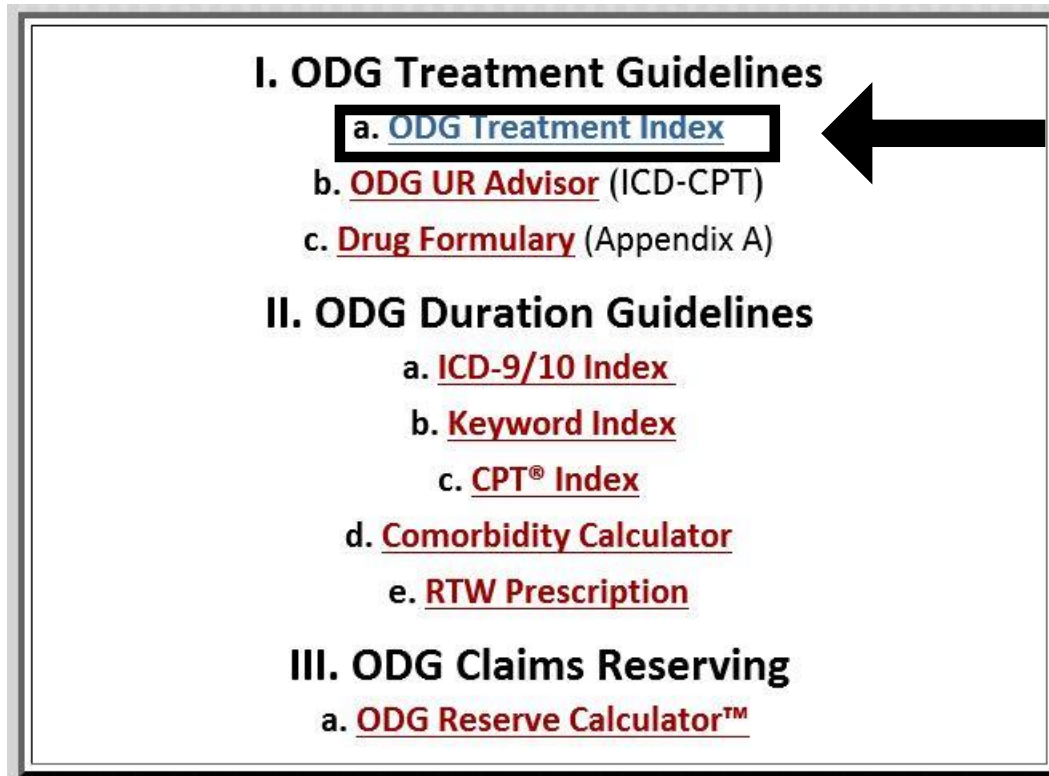
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MMI?

Diagnosis?

- **Adhesive Capsulitis**

- **Fracture of radius/ulna (forearm)**

- **Fracture of humerus**

2015

Official Disability Guidelines (20ᵗʰ annual edition) &
ODG Treatment in Workers' Comp (13ᵗʰ annual edition)

I. ODG Treatment Guidelines
a. ODG Treatment Index
b. ODG UR Advisor (ICD-CPT)
c. Drug Formulary (Appendix A)

II. ODG Duration Guidelines
a. ICD-9/10 Index
b. Keyword Index
c. CPT® Index
d. Comorbidity Calculator
e. RTW Prescription

III. ODG Claims Reserving
a. ODG Reserve Calculator™

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Shoulder

Knee & Leg (updated 05/05/15)

Low Back (updated 05/15/15)

Mental Illness & Stress (updated 03/25/15)

Neck & Upper Back (updated 05/12/15)

Pain (updated 06/15/15)

Pulmonary (updated 05/27/15)

Shoulder (updated 05/04/15)

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Procedure Summary

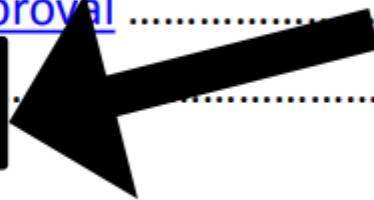*Integrated Treatment/Disability Duration Guidelines*
Shoulder (Acute & Chronic)

Back to ODG - TWC Index

(updated 05/04/15)

CONTENTS

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Procedure Summary - Shoulder

Procedure/topic	Summary of medical evidence
Acromioplasty	See Surgery for impingement syndrome.
Activity restrictions	See Work.
	Recommended as an option for rotator cuff tendonitis, frozen shoulder, subacromial impingement syndrome, and rehab following surgery. A review of 9 trials with varying placebo controls showed there was possibly some support for short-term benefit in regards to pain and function. (Green-Cochrane, 2005) Acupuncture was of benefit over placebo in terms of function, and was more effective when combined with exercise compared to exercise alone. Several small clinical trials have found acupuncture to be effective on shoulder pain, but referral is dependent on the availability of experienced providers with consistently good outcomes. Among those shoulder indications, found to have positive outcomes from acupuncture, were rotator cuff tendonitis, frozen shoulder, subacromial impingement syndrome, and rehab following arthroscopic acromioplasty. (Kleinhenz, 1999) (Sun, 2001) (Romoli, 2000) (Nabeta, 2002) (Gilbertson, 2003) (Guerra, 2003) (He, 2004) (Vickers, 2004) (Grant, 2004) (Michener, 2004) (Guerra de Hoyos, 2004) On the other hand, a recent trial did not show any benefit of acupuncture compared with placebo TENS when added to the exercise treatment of rotator cuff tendonitis. (Razavi, 2004) The results of this trial suggest that acupuncture is more efficacious than ultrasound when applied in addition to home exercises in patients with impingement syndrome. Both groups improved, but the acupuncture group had a larger improvement in the combined score. (Johansson, 2005) This recent RCT found that either electroacupuncture or interferential electrotherapy, in combination with shoulder exercises, is equally effective in treating frozen shoulder patients. It should be noted that this study only showed the combined treatment effects with exercise as compared to no treatment, so the entire positive effect could have been due to the use of exercise alone. (Cheing, 2008) Naturopathic treatment combining acupuncture, dietary counseling, and hydrolytic enzymes was more effective than physical exercise plus placebo for treating rotator cuff tendinitis, in a recent RCT. (Szczurko, 2009) Both subacromial corticosteroid injection and a series of 10 acupuncture treatments combined with home exercises significantly decreased pain and improved shoulder function in patients with subacromial impingement syndrome. (Johansson, 2011) The latest UK Health Technology Assessment on management of frozen shoulder concludes that there was insufficient evidence to make conclusions with any certainty about the effectiveness of acupuncture for primary frozen shoulder and in what situations it is likely to be effective. (Maund, 2012) For an overview of acupuncture and other conditions in which this modality is recommended see the Pain Chapter.
	ODG Acupuncture Guidelines:
	Initial trial of 3-4 visits over 2 weeks
	With evidence of objective functional improvement, total of up to 8-12 visits over 4-6 weeks (Note: The evidence is inconclusive for repeating this procedure beyond an initial short course of therapy.)

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Physical Therapy

Physical Therapy

Recommended. Positive (limited evidence). See also specific physical therapy modalities by name. Use of a home pulley system for stretching and strengthening should be recommended. (Thomas, 2001) For rotator cuff disorders, physical therapy can improve short-term recovery and long-term function. For rotator cuff pain with an intact tendon, a trial of 3 to 6 months of conservative therapy is reasonable before orthopaedic referral. Patients with small tears of the rotator cuff may be referred to an orthopaedist after 6 to 12 weeks of conservative treatment. The mainstays of treatment for instability of the glenohumeral joint are modification of physical activity and an aggressive strengthening program. Osteoarthritis of the glenohumeral joint usually responds to analgesics and injections into the glenohumeral joint. However, aggressive physical therapy can actually exacerbate this condition because of a high incidence of joint incongruity. (Burbank, 2008) (Burbank2, 2008)

Impingement syndrome: For impingement syndrome significant results were found in pain reduction and isodynamic strength. (Bang, 2000) (Verhagen-Cochrane, 2004) (Michener, 2004) Self-training may be as effective as physical therapist-supervised rehabilitation of the shoulder in post-surgical treatment of patients treated with arthroscopic subacromial decompression. (Anderson, 1999) A recent structured review of physical rehabilitation techniques for patients with subacromial impingement syndrome found that therapeutic exercise was the most widely studied form of physical intervention and demonstrated short-term and long-term effectiveness for decreasing pain and reducing functional loss. Upper quarter joint mobilizations in combination with therapeutic exercise were more effective than exercise alone. Laser therapy is an effective single intervention when compared with placebo treatments, but adding laser treatment to therapeutic exercise did not improve treatment efficacy. The limited data available do not support the use of ultrasound as an effective treatment for reducing pain or functional loss. Two studies evaluating the effectiveness of acupuncture produced equivocal results. (Sauers, 2005) Both physical therapy and corticosteroid injections significantly improve symptoms in patients with shoulder impingement syndrome (approximately 50% improvement in Shoulder Pain and Disability Index scores maintained through 1 year), but physical therapy may be more efficient. (Rhon, 2014)

Rotator cuff: There is poor data from non-controlled open studies favoring conservative interventions for rotator cuff tears, but this still needs to be proved. Considering these interventions are less invasive and less expensive than the surgical approach, they could be the first choice for the rotator cuff tears, until we have better and more reliable results from clinical trials. (Ejnisman-Cochrane, 2004) External rotator cuff strengthening is recommended because an imbalance between the relatively overstrengthened internal rotators and relatively weakened external rotators could cause damage to the shoulder and elbow, resulting in injury. (Byram, 2009) *Adhesive capsulitis*: For adhesive capsulitis, injection of corticosteroid combined with a simple home exercise program is effective in improving shoulder pain and disability in patients. Adding supervised physical therapy provides faster improvement in shoulder range of motion. When used alone, supervised physical therapy is of limited efficacy in the management of adhesive capsulitis. (Carette, 2003) Physical therapy following arthrographic joint distension for adhesive capsulitis provided no additional benefits in terms of pain, function, or quality of life but resulted in sustained greater active range of shoulder movement and participant-perceived improvement up to 6 months. (Buchbinder, 2007) Use of the Shoulder Dynasplint System (Dynasplint Systems, Inc., Severna Park, MD) may be an effective adjunct "home therapy" for adhesive capsulitis, combined with PT. (Gaspar, 2009) The latest UK Health Technology Assessment on management of frozen shoulder concludes that based on the best available evidence there may be benefit from stretching and from high-grade mobilization technique. (Maund, 2012)

Active Treatment versus Passive Modalities: See the Low Back Chapter for more information. The use of active treatment modalities instead of passive treatments is associated with substantially better clinical outcomes. The most commonly used active treatment modality is Therapeutic exercises (97110), but other active therapies may be recommended as well, including Neuromuscular reeducation (97112), Manual therapy (97140), and Therapeutic activities/exercises (97530). Physical modalities, such as massage, diathermy, cutaneous laser treatment, ultrasonography, transcutaneous electrical neurostimulation (TENS) units, and biofeedback are not supported by high quality medical studies, but they may be useful in the initial conservative treatment of acute shoulder symptoms, depending on the experience of local physical therapy providers available for referral.

See also more specific listings: Activity restrictions; Acupuncture; Bipolar interferential electrotherapy; Biofeedback; Biopsychosocial rehab; Cold lasers; Cold packs; Continuous-flow cryotherapy; Continuous passive motion (CPM); Cutaneous laser treatment; Deep friction massage; Diathermy; Dynasplint system; Electrical stimulation; Ergonomic interventions; ERMI Flexionater®/ Extensionater®; Exercises; Flexionators (extensionators); Graston instrument assisted technique (manual therapy); Home exercise kits; Ice packs; Interferential current stimulation (ICS); Iontophoresis; Kinesio tape (KT); Low level laser therapy (LLLT); Manipulation; Massage; Mechanical traction; Neuromuscular electrical stimulation (NMES devices); Occupational therapy; Polar care (cold therapy unit); Range of motion; Return to work; Static progressive stretch (SPS) therapy; TENS (transcutaneous electrical nerve stimulation); Thermotherapy; Ultrasound, therapeutic; Work; Work conditioning, work hardening.

ODG Physical Therapy Guidelines –

Allow for fading of treatment frequency (from up to 3 visits per week to 1 or less), plus active self-directed home PT. Also see other general guidelines that apply to all conditions under Physical Therapy in the ODG Preface.

Rotator cuff syndrome/Impingement syndrome:

Medical treatment: 10 visits over 8 weeks

Post-injection treatment: 1-2 visits over 1 week

Post-surgical treatment, arthroscopic: 24 visits over 14 weeks

Physical Therapy

Physical Therapy

ODG Physical Therapy Guidelines –

Allow for fading of treatment frequency (from up to 3 visits per week to 1 or less), plus active self-directed home PT. Also see other general guidelines that apply to all conditions under Physical Therapy in the ODG Preface.

Rotator cuff syndrome/Impingement syndrome :

Medical treatment: 10 visits over 8 weeks

Post-injection treatment: 1-2 visits over 1 week

Post-surgical treatment, arthroscopic: 24 visits over 14 weeks

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Physical Therapy

Arthritis (Osteoarthrosis; Rheumatoid arthritis; Arthropathy, unspecified)
Medical treatment: 9 visits over 8 weeks

Post-injection treatment: 1-2 visits over 1 week

Post-surgical treatment, arthroplasty, shoulder: 24 visits over 10 weeks

Brachial plexus lesions (Thoracic outlet syndrome):

Medical treatment: 14 visits over 6 weeks

Post-surgical treatment: 20 visits over 10 weeks

Fracture of clavicle:

8 visits over 10 weeks

Fracture of scapula:

8 visits over 10 weeks

Fracture of humerus:

Medical treatment: 18 visits over 12 weeks

Post-surgical treatment: 24 visits over 14 weeks

Physical Therapy

Adhesive capsulitis:

Medical treatment: 16 visits over 8 weeks

Post-surgical treatment: 24 visits over 14 weeks

Physical Therapy

Fracture of humerus:

Medical treatment: 18 visits over 12 weeks

Post-surgical treatment: 24 visits over 14 weeks

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MMI?

PT ODG recommendation for Dx?

Adhesive Capsulitis:

• Medical treatment: 16 visits over 8 weeks

• Post-surgical treatment: 24 visits over 14 weeks

MMI?

PT ODG recommendation for Dx?

Fracture of radius/ulna (forearm):

- Medical treatment: 16 visits over 8 weeks

- Post-surgical treatment: 16 visits over 8 weeks

Fracture of humerus:

- Medical treatment: 18 visits over 12 weeks

- Post-surgical treatment: 24 visits over 14 weeks

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MMI – Upper Extremity Case 1

Question for designated doctor:

Has MMI been reached; if so, on what date?

- If not at MMI, why not and what is needed to reach MMI?   Is this consistent with ODG (including Appendix D)?

- If at MMI, why and what is the date?

- Explain and give rationale for your MMI date.

- Complete DWC Form-069 and narrative report.

1. Has MMI been reached; if so, on what date?

A. Yes, at the completion of 3 weeks of PT (9 sessions).
B. Yes, date of the designated doctor exam.
C. No, not at

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Questions about MMI?

Impairment Rating

Impairment Rating Considerations

- Assignment of an impairment rating for the current compensable injury shall be based on the injured employee's condition on the MMI date considering the medical record and the certifying examination.

- Assign one whole body impairment rating for the current compensable injury.

- Explain in your report what you believe the compensable injury to be and the basis for this from the medical records and your exam.

How to Determine Impairment Rating

- Review the medical records prior to your exam
- Perform a thorough, relevant physical examination of all compensable body areas/systems.
- Correlate with findings in prior medical records.
- Make referrals, if necessary, to answer question.
- Use the rating criteria contained in the appropriate edition of the AMA *Guides to the Evaluation of Permanent Impairment*, 4th Edition.

How to Determine Impairment Rating

- Use the rating criteria contained in the appropriate edition of the AMA *Guides to the Evaluation of Permanent Impairment*.

- **Show your work!** so that "... any knowledgeable person can compare the clinical findings with the guides criteria and determine whether or not the impairment estimates reflect those criteria." AMA *Guides,* page 8

- Document the findings and explain the impairment rating in your narrative report, plus relevant worksheets.

- Complete and sign the DWC Form-069.

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Impairment Rating

Question for designated doctor:

On the certified MMI date, what is the whole person impairment rating?

- **Show your work!**

How to Determine Impairment Rating Hand and Upper Extremity

- No rating for hand/upper extremity dominance.

- No specific requirement (or prohibition) to measure the uninvolved contralateral upper extremity in the 4th Ed. of *Guides* (as per 3rd, 5th and 6th Editions).

How to Determine Impairment Rating Hand and Upper Extremity

Measurements must be consistent:

- Between examiners (pp. 7, 8, 9)

- By the same examiner with repeated measurements "may be expected to lie within 10% of each other" (p. 9)

- "…plausible and relate to the impairment being evaluated" (p. 8)

How to Determine Impairment Rating Hand and Upper Extremity

- **Active,** not passive range of motion (ROM) should be measured/rated; p. 15
- **Round UE ROM to nearest 10 degrees** per **written instructions** AMA *Guides* 4th ed., pp. 25-44 ; also p. 15 (NOT 5 degree increments per Figure 29, p. 38 wrist RD/UD)
  - Appeals Panel decision 022504-s, decided November 12

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Round UE ROM to nearest 10 deg

- **NOT 5 degree increments per Figure 29, p. 38 wrist RD/UD**
- Appeals Panel decision 022504-s, decided November 12, 2002

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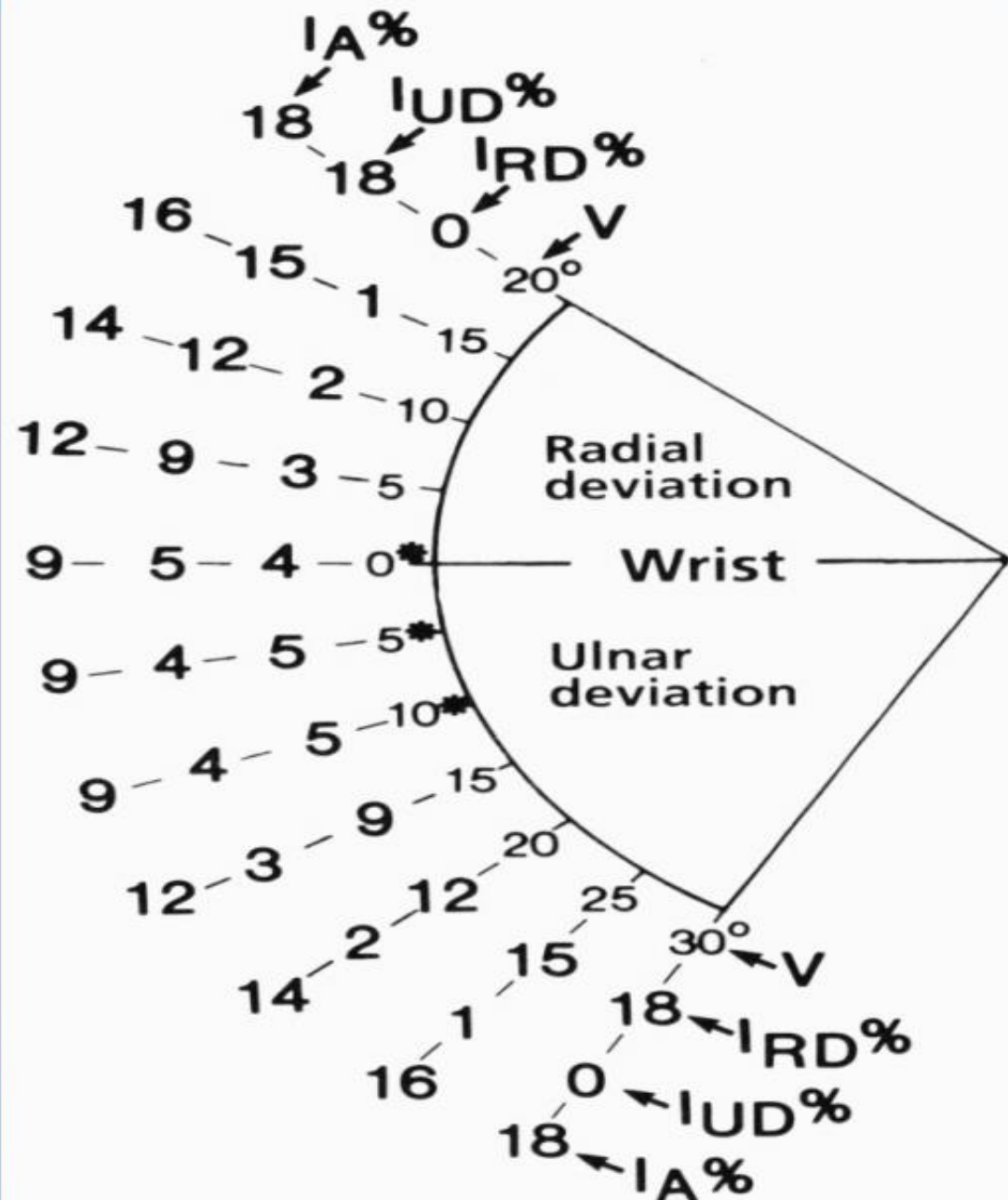
How to Determine Impairment Rating Hand and Upper Extremity

- UE ROM - Guides, 4th do not directly address rounding 5 degrees; however generally recommended that <5 degrees round down, ≥5 degrees round up

- Do not round the WHOLE PERSON impairment rating in DWC system as instructed in AMA *Guides* (p. 9)

MOST IMPORTANT "REQUIREMENT" FOR UPPER EXTREMITY IMPAIRMENT EVALUATION:
Use Figure 1 - pp. 16-17

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Figure 1, pp. 16-17

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand)

Side ☐ R ☐ L

Name _____ Age _____ Sex ☐ M ☐ F Dominant hand ☐ R ☐ L Date _____

Occupation _____ Diagnosis _____

	Abnormal motion				Amputation	Sensory loss	Other disorders	Hand impairment%
	Record motion, ankylosis, and impairment %				Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%

Thumb

		Flexion	Extension	Ankylosis	IMP%
IP	Angle°				
	IMP%				
MP	Angle°				
	IMP%				

		Motion	Ankylosis	IMP%
Radial abduction	Angle°			
	IMP%			
CMC Adduction	CMS			
	IMP%			
Opposition	CMS			
	IMP%			

Abnormal motion [1]
Amputation [2]
Sensory loss [3]
Other disorders [4]
Digit impairment % • Combine 1, 2, 3, 4

Add impairment %   CMC + MP + IP =   [1] IMP % = [2] IMP % = [3] IMP % = [4] **Hand impairment % *Convert above**

Index — Flexion, Extension, Ankylosis, IMP% — DIP Angle°/IMP%, PIP Angle°/IMP%, MP Angle°/IMP%
Abnormal motion [1]; Amputation [2]; Sensory loss [3]; Other disorders [4]; Digit impairment % • Combine 1, 2, 3, 4
• Combine impairment %   MP + PIP + DIP =   [1] IMP % = [2] IMP % = [3] IMP % = [4] **Hand impairment % *Convert above**

Middle — DIP Angle°/IMP%, PIP Angle°/IMP%, MP Angle°/IMP%
Abnormal motion [1]; Amputation [2]; Sensory loss [3]; Other disorders [4]; Digit impairment % • Combine 1, 2, 3, 4
• Combine impairment %   MP + PIP + DIP =   [1] IMP % = [2] IMP % = [3] IMP % = [4] **Hand impairment % *Convert above**

Ring — DIP Angle°/IMP%, PIP Angle°/IMP%, MP Angle°/IMP%
Abnormal motion [1]; Amputation [2]; Sensory loss [3]; Other disorders [4]; Digit impairment % • Combine 1, 2, 3, 4
• Combine impairment %   MP + PIP + DIP =   [1] IMP % = [2] IMP % = [3] IMP % = [4] **Hand impairment % *Convert above**

Little — DIP Angle°/IMP%, PIP Angle°/IMP%, MP Angle°/IMP%
Abnormal motion [1]; Amputation [2]; Sensory loss [3]; Other disorders [4]; Digit impairment % • Combine 1, 2, 3, 4
• Combine impairment %   MP + PIP + DIP =   [1] IMP % = [2] IMP % = [3] IMP % = [4] **Hand impairment % *Convert above**

Total hand impairment (Add hand impairment % for thumb + index + middle + ring + little finger) = _____ %

Upper extremity impairment (†Convert total hand impairment % to upper extremity impairment %) = _____ %; enter on Part 2 , Line II

If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment:‡ = _____ %

• Combined Values Chart; (p. 322-324)   *Use Table 1 (Digits to hand p. 18);   †Use Table 2 (Hand to upper extremity p. 19)   ‡Use Table 3 (p. 20)
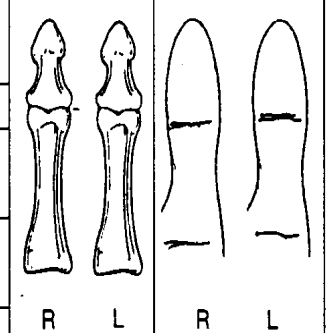** Courtesy of G. de Groot Swanson, MD

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand) Side ☐R ☐L

Name_____ Age_____ Sex ☐M ☐F Dominant hand ☐R ☐L Date_____

Occupation_____ Diagnosis_____

Abnormal motion					Amputation	Sensory loss	Other disorders	Hand impairment%
Record motion, ankylosis, and impairment %					Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%

Thumb

			Flexion	Extension	Ankylosis	IMP%
IP	Angle°				
	IMP%				
MP	Angle°				
	IMP%				

			Motion	Ankylosis	IMP%
CMC	Radial abduction	Angle°			
		IMP%			
	Adduction	CMS			
		IMP%			
	Opposition	CMS			
		IMP%			

R L   R L

	[1]	[2]	[3]	[4]	Hand impairment %
Add impairment % CMC + MP + IP =		IMP % =	IMP % =	IMP % =	*Convert above

Abnormal motion [1]
Amputation [2]
Sensory loss [3]
Other disorders [4]
Digit impairment % • Combine 1, 2, 3, 4

Index

			Flexion	Extension	Ankylosis	IMP%
DIP	Angle°				
	IMP%				
PIP	Angle°				
	IMP%				
MP	Angle°				
	IMP%				

Abnormal motion [1]
Amputation [2]
Sensory loss [3]
Other disorders [4]
Digit impairment % • Combine 1, 2, 3, 4

	[1]	[2]	[3]	[4]	Hand impairment %
• Combine impairment % MP + PIP + DIP =		IMP % =	IMP % =	IMP % =	*Convert above

Angle°   Abnormal motion [1]
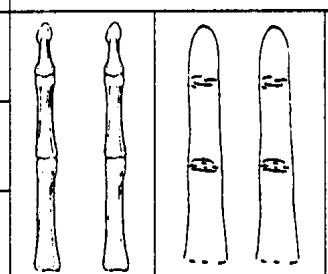
Figure 1, pp. 16-17

			Combine impairment % MP + PIP + DIP =	IMP % =	IMP % =	IMP % =	*Convert above
Ring	DIP	Angle°					Abnormal motion [1]
		IMP%					Amputation [2]
	PIP	Angle°					Sensory loss [3]
		IMP%					Other disorders [4]
	MP	Angle°					Digit impairment % • Combine 1, 2, 3, 4
		IMP%					
				[1]	[2]	[3]	[4] Hand impairment % *Convert above

• Combine impairment %   MP + PIP + DIP =   IMP % =   IMP % =   IMP % =

				IMP % =	IMP % =	IMP % =	*Convert above
Little	DIP	Angle°					Abnormal motion [1]
		IMP%					Amputation [2]
	PIP	Angle°					Sensory loss [3]
		IMP%					Other disorders [4]
	MP	Angle°					Digit impairment % • Combine 1, 2, 3, 4
		IMP%					
				[1]	[2]	[3]	[4] Hand impairment % *Convert above

• Combine impairment %   MP + PIP + DIP =   IMP % =   IMP % =   IMP % =

Total hand impairment (Add hand impairment % for thumb + index + middle + ring + little finger) =   %

Upper extremity impairment (†Convert total hand impairment % to upper extremity impairment %) =   %; enter on Part 2 , Line II

If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment:‡ =   %
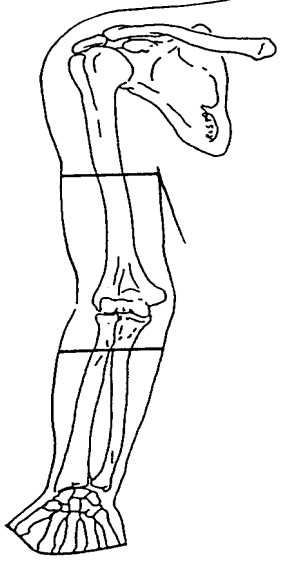
• Combined Values Chart; (p. 322-324)   *Use Table 1 (Digits to hand p. 18);   †Use Table 2 (Hand to upper extremity p. 19)   ‡Use Table 3 (p. 20)
* Courtesy of G. de Groot Swanson, MD

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Figure 1, pp. 16-17

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Figure 1. Upper Extremity Impairment Evaluation Record—**Part 2 (Wrist, elbow, and shoulder)**   Side ☐ R   ☐ L

Name_____   Age_____ .   Sex ☐ M ☐ F   Dominant hand ☐ R ☐ L   Date_____

Occupation_____   Diagnosis_____

	Abnormal motion				Other disorders	Regional impairment %	Amputation
	Record motion, ankylosis and impairment %				List type & impairment %	• Combine [1] + [2]	Mark level & impairment %
Wrist		Flexion	Extension	Ankylosis	IMP%			
	Angle°							
	IMP%							
		RD	UD	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + RD/UD =				[1]	IMP% =	[2]	
Elbow		Flexion	Extension	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Pro	Sup	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + PRO/SUP =				[1]	IMP% =	[2]	
Shoulder		Flexion	Extension	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Add	Abd	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Int Rot	Ext Rot	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + Add/Abd + IR/ER =				[1]	IMP% =	[2]	IMP %

I. Amputation impairment (other than digitis)	=
II. Regional impairment of upper extremity • (Combine hand _____% + wrist _____% + elbow _____% + shoulder _____%)	=
III. Peripheral nerve system impairment	=
IV. Peripheral vascular system impairment	=
V. Other disorders (not included in regional impairment)	=

Total upper extremity impairment (• Combine I + II + III + IV + V)	=
Impairment of the whole person (Use Table 3 p. 20)	=

If both limbs are involved, calculate the whole-person impairment for each on a separate chart and *combine* the percents (Combined Values Chart).

Figure 1, pp. 16-17

Figure 1. Upper Extremity Impairment Evaluation Record–Part 2 (Wrist, elbow, and shoulder)   Side ☐ R   ☐ L

Name_____   Age_____ . Sex ☐ M ☐ F   Dominant hand ☐ R ☐ L   Date_____

Occupation_____   Diagnosis_____

Abnormal motion					Other disorders	Regional impairment %	Amputation
Record motion, ankylosis and impairment %					List type & impairment %	• Combine [1] + [2]	Mark level & impairment %

Wrist

	Flexion	Extension	Ankylosis	IMP%			
Angle°							
IMP%							
	RD	UD	Ankylosis	IMP%			
Angle°							
IMP%							

Add IMP% F/E + RD/UD =   [1]   IMP% =   [2]

Elbow

	Flexion	Extension	Ankylosis	IMP%			
Angle°							
IMP%							
	Pro	Sup	Ankylosis	IMP%			
Angle°							
IMP%							

Add IMP% F/E + PRO/SUP =   [1]   IMP% =   [2]

|	Flexion	Extension	Ankylosis	IMP%			
Angle°							
IMP%							

Figure 1, pp. 16-17

I. Amputation impairment (other than digitis)	=
II. Regional impairment of upper extremity • (Combine hand _____% + wrist _____% + elbow _____% + shoulder _____%)	=
III. Peripheral nerve system impairment	=
IV. Peripheral vascular system impairment	=
V. Other disorders (not included in regional impairment)	=

Total upper extremity impairment (• Combine I + II + III + IV + V)	=
Impairment of the whole person (Use Table 3 p. 20)	=

If both limbs are involved, calculate the whole-person impairment for each on a separate chart and *combine* the percents (Combined Values Chart).
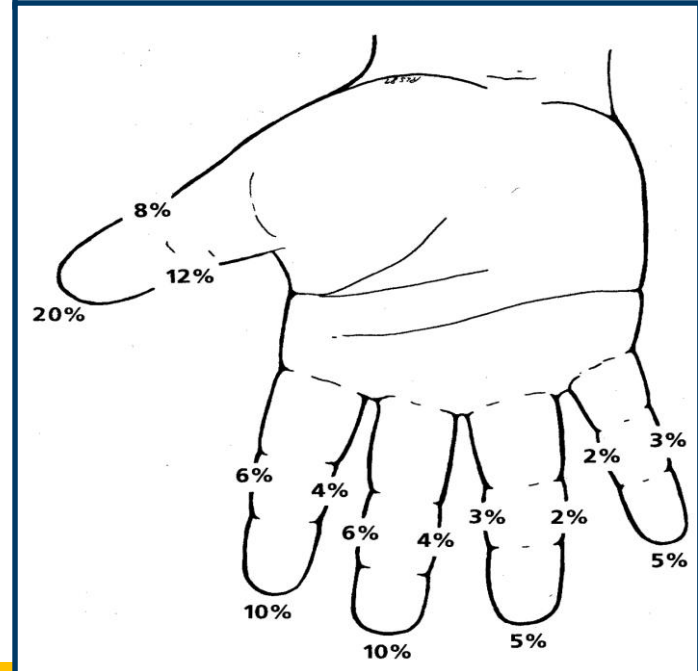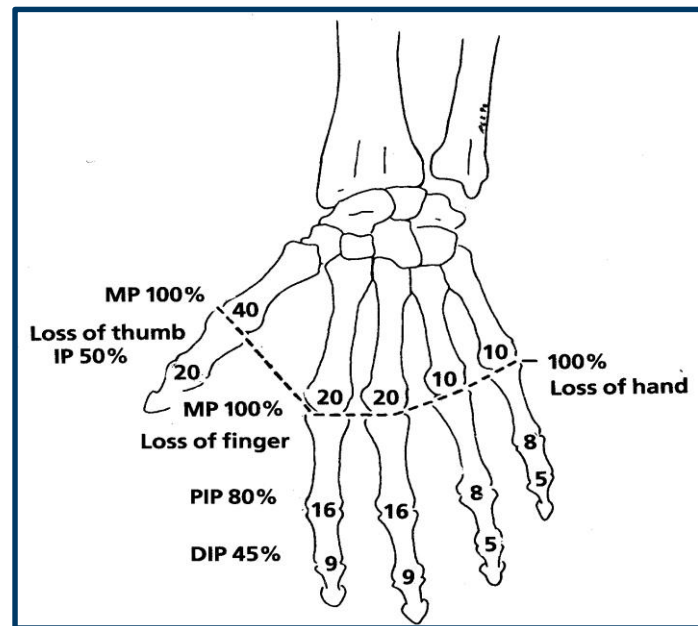
Hand and Upper Extremity Impairment Sections Are Different Than The Other Chapters

Whole Person Concept
Upper Extremity
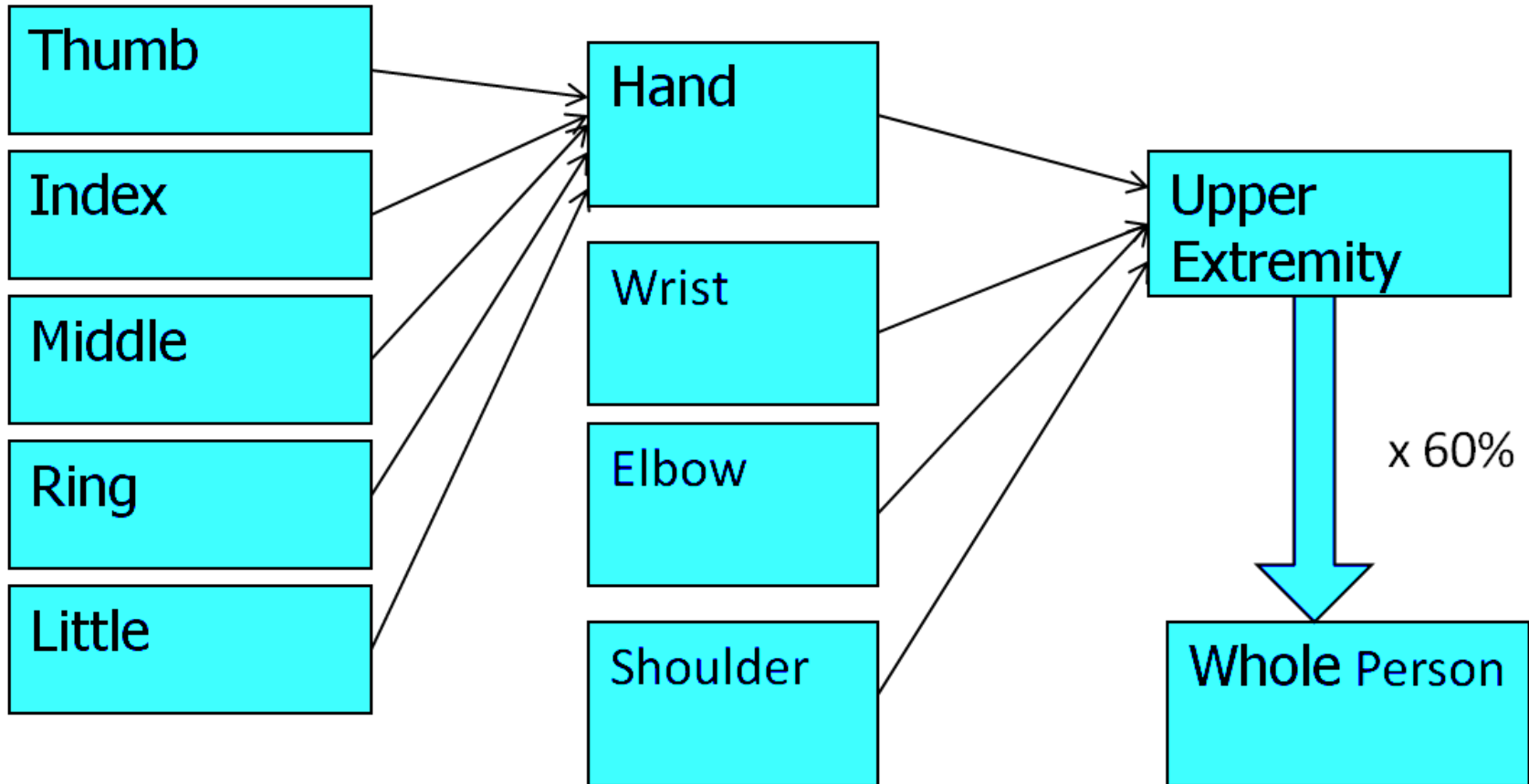
Hand Units

- The five digits
- Unequally divided, in terms of hand function

  (Different values according to weighted functional importance)

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Relationship of Upper Extremity (UE) to Whole Person (WP)

- Upper Extremity = 60% of Whole Person

- Hand = 90% Upper Extremity

- Thumb = 40% Hand

- Index or Middle Finger = 20% Hand
- Ring or Little Finger = 10% Hand

These Impairment Values Have to be Converted to **Whole Person** by Using:

Table 1, p. 18

Table 2, p. 19

Table 3, p. 20

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T. 1, P. 18

Relationship of Impairment of the Digits to Impairment of the Hand.

% Impairment of			% Impairment of			% Impairment of		
Thumb		**Hand**	**Index or middle finger**		**Hand**	**Ring or little finger**		**Hand**
0 -	1 =	0	0 -	2 =	0	0 -	4 =	0
2 -	3 =	1	3 -	7 =	1	5 -	14 =	1
4 -	6 =	2	8 -	12 =	2	15 -	24 =	2
7 -	8 =	3	13 -	17 =	3	25 -	34 =	3
9 -	11 =	4	18 -	22 =	4	35 -	44 =	4
12 -	13 =	5	23 -	27 =	5	45 -	54 =	5
14 -	16 =	6	28 -	32 =	6	55 -	64 =	6
17 -	18 =	7	33 -	37 =	7	65 -	74 =	7
19 -	21 =	8	38 -	42 =	8	75 -	84 =	8
22 -	23 =	9	43 -	47 =	9	85 -	94 =	9
24 -	26 =	10	48 -	52 =	10	95 - 100	=	10
27 -	28 =	11	53 -	57 =	11			
29 -	31 =	12	58 -	62 =	12			
32 -	33 =	13	63 -	67 =	13			
34 -	36 =	14	68 -	72 =	14			
37 -	38 =	15	73 -	77 =	15			
39 -	41 =	16	78 -	82 =	16			
42 -	43 =	17	83 -	87 =	17			
44 -	46 =	18	88 -	92 =	18			
47 -	48 =	19	93 -	97 =	19			
49 -	51 =	20	98 - 100	=	20			
52 -	53 =	21						
54 -	56 =	22						
57 -	58 =	23						
59 -	61 =	24						
62 -	63 =	25						
64 -	66 =	26						
67 -	68 =	27						
69 -	71 =	28						
72 -	73 =	29						
74 -	76 =	30						
77 -	78 =	31						
79 -	81 =	32						
82 -	83 =	33						
84 -	86 =	34						
87 -	88 =	35						
89 -	91 =	36						
92 -	93 =	37						
94 -	96 =	38						
97 -	98 =	39						
99 - 100	=	40						

*See Table 2 (p. 19) for converting hand impairment to upper extremity impairment.

Table 2. Relationship of Impairment of the Hand to Impairment of the Upper Extremity.*

% Impairment of		% Impairment of		% Impairment of		% Impairment of		% Impairment of		% Impairment of	
Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity
0 = 0		18 = 16		35 = 32		53 = 48		70 = 63		88 = 79	
1 = 1		19 = 17		36 = 32		54 = 49		71 = 64		89 = 80	
2 = 2				37 = 33				72 = 65			
3 = 3		20 = 18		38 = 34		55 = 50		73 = 66		90 = 81	
4 = 4		21 = 19		39 = 35		56 = 50		74 = 67		91 = 82	
		22 = 20				57 = 51				92 = 83	
5 = 5		23 = 21		40 = 36		58 = 52		75 = 68		93 = 84	
6 = 5		24 = 22		41 = 37		59 = 53		76 = 68		94 = 85	
7 = 6				42 = 38				77 = 69			
8 = 7		25 = 23		43 = 39		60 = 54		78 = 70		95 = 86	
9 = 8		26 = 23		44 = 40		61 = 55		79 = 71		96 = 86	
10 = 9		27 = 24		45 = 41		62 = 56		80 = 72		97 = 87	
11 = 10		28 = 25		46 = 41		63 = 57		81 = 73		98 = 88	
12 = 11		29 = 26		47 = 42		64 = 58		82 = 74		99 = 89	
13 = 12				48 = 43				83 = 75			
14 = 13		30 = 27		49 = 44		65 = 59		84 = 76		100 = 90	
		31 = 28				66 = 59					
15 = 14		32 = 29		50 = 45		67 = 60		85 = 77			
16 = 14		33 = 30		51 = 46		68 = 61		86 = 77			
17 = 15		34 = 31		52 = 47		69 = 62		87 = 78			

*Consult Table 3 (p. 20) to convert upper extremity impairment to whole-person impairment.

Relationship of Impairment of the Upper Extremity to Impairment of the Whole Person

% Impairment of			% Impairment of			% Impairment of		
Upper extremity		Whole person	Upper extremity		Whole person	Upper extremity		Whole person
0	=	0	35	=	21	70	=	42
1	=	1	36	=	22	71	=	43
2	=	1	37	=	22	72	=	43
3	=	2	38	=	23	73	=	44
4	=	2	39	=	23	74	=	44
5	=	3	40	=	24	75	=	45
6	=	4	41	=	25	76	=	46
7	=	4	42	=	25	77	=	46
8	=	5	43	=	26	78	=	47
9	=	5	44	=	26	79	=	47
10	=	6	45	=	27	80	=	48
11	=	7	46	=	28	81	=	49
12	=	7	47	=	28	82	=	49
13	=	8	48	=	29	83	=	50
14	=	8	49	=	29	84	=	50
15	=	9	50	=	30	85	=	51
16	=	10	51	=	31	86	=	52
17	=	10	52	=	31	87	=	52
18	=	11	53	=	32	88	=	53
19	=	11	54	=	32	89	=	53
20	=	12	55	=	33	90	=	54
21	=	13	56	=	34	91	=	55
22	=	13	57	=	34	92	=	55
23	=	14	58	=	35	93	=	56
24	=	14	59	=	35	94	=	56
25	=	15	60	=	36	95	=	57
26	=	16	61	=	37	96	=	58
27	=	16	62	=	37	97	=	58
28	=	17	63	=	38	98	=	59
29	=	17	64	=	38	99	=	59
30	=	18	65	=	39	100	=	60
31	=	19	66	=	40			
32	=	19	67	=	40			
33	=	20	68	=	41			
34	=	20	69	=	41			

Hand and Upper Extremity Methods for Evaluating Impairment

- **Amputation**
- Sensory loss of digits
- ROM
- Peripheral nerve disorders
  - Cervical Spinal Nerve Roots
  - Brachial Plexus
  - Major Peripheral Nerves
- Vascular Disorders
- "Other Disorders"

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Amputation

- Loss of entire UE = 60% WP

- Rate amputation per Figure 7 (thumb), Figure 17 (finger), Figure 3 (Impairments of the digits and hand), or Figure 2 (Impairments of the UE)

- **Use Figure 1**

- For digits
  - Convert digit to hand using T. 1, P. 18
  - Covert hand to UE using T. 2, P. 19

- Convert UE to WP if there are no other UE ratings using T. 3, P. 20

Figure 7, p. 24

Thumb impairment
Amputation impairment %
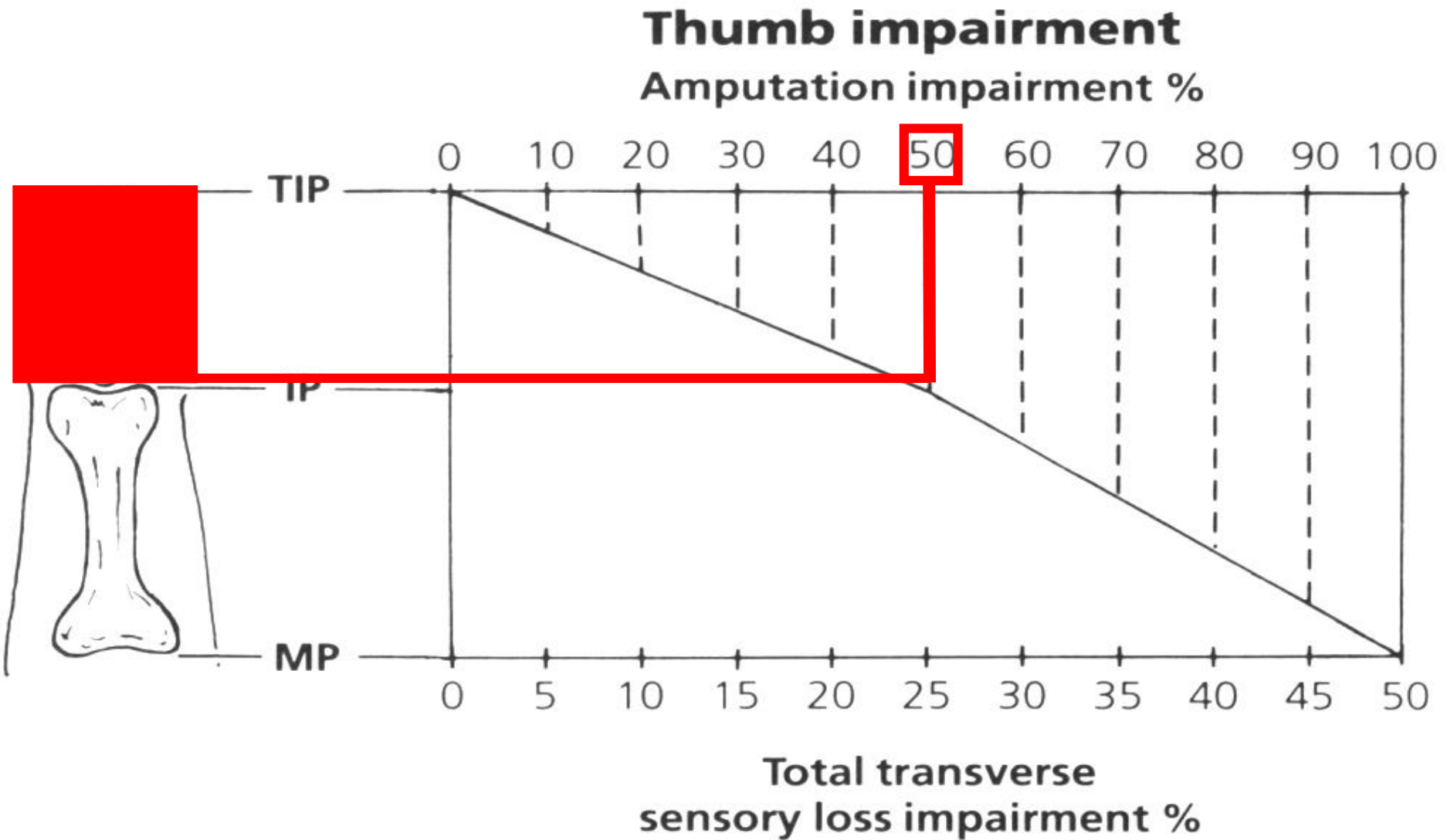
Figure 17, p. 30

Finger Impairment Due to Amputation at Various Lengths (top scale). Total transverse sensory loss impairments correspond to 50% of amputation impairments.*

Figure 17. Finger Impairment Due to Amputation at Various Lengths (top scale) and Total Transverse Sensory Loss (bottom scale). Total transverse sensory loss impairments correspond to 50% of amputation impairments.*
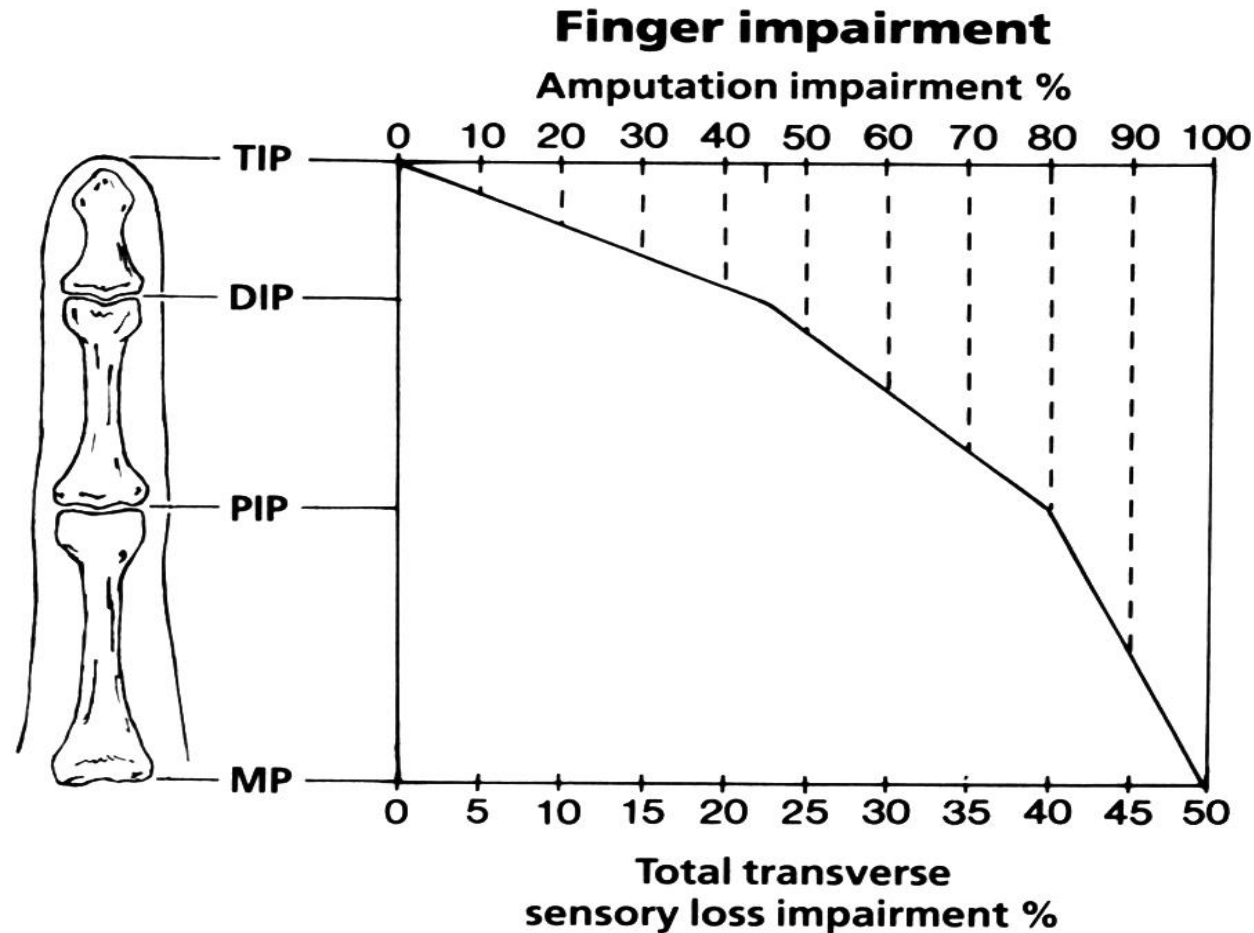
Finger impairment

*Redrawn with permission from Swanson, AB[34], p. 927, Fig. 2.

Figure 3, p. 18

- This figure can be confusing (percents outside and inside digits).

- Rarely used.

- Use Figure 7 and Figure 17 for thumb and finger amputations.

MP 100%
40
Loss of thumb IP 50%
20
10 — 100% Loss of hand
MP 100%
20 20 10
Loss of finger
8
5
PIP 80%
16 16 8
DIP 45%
9 9 5
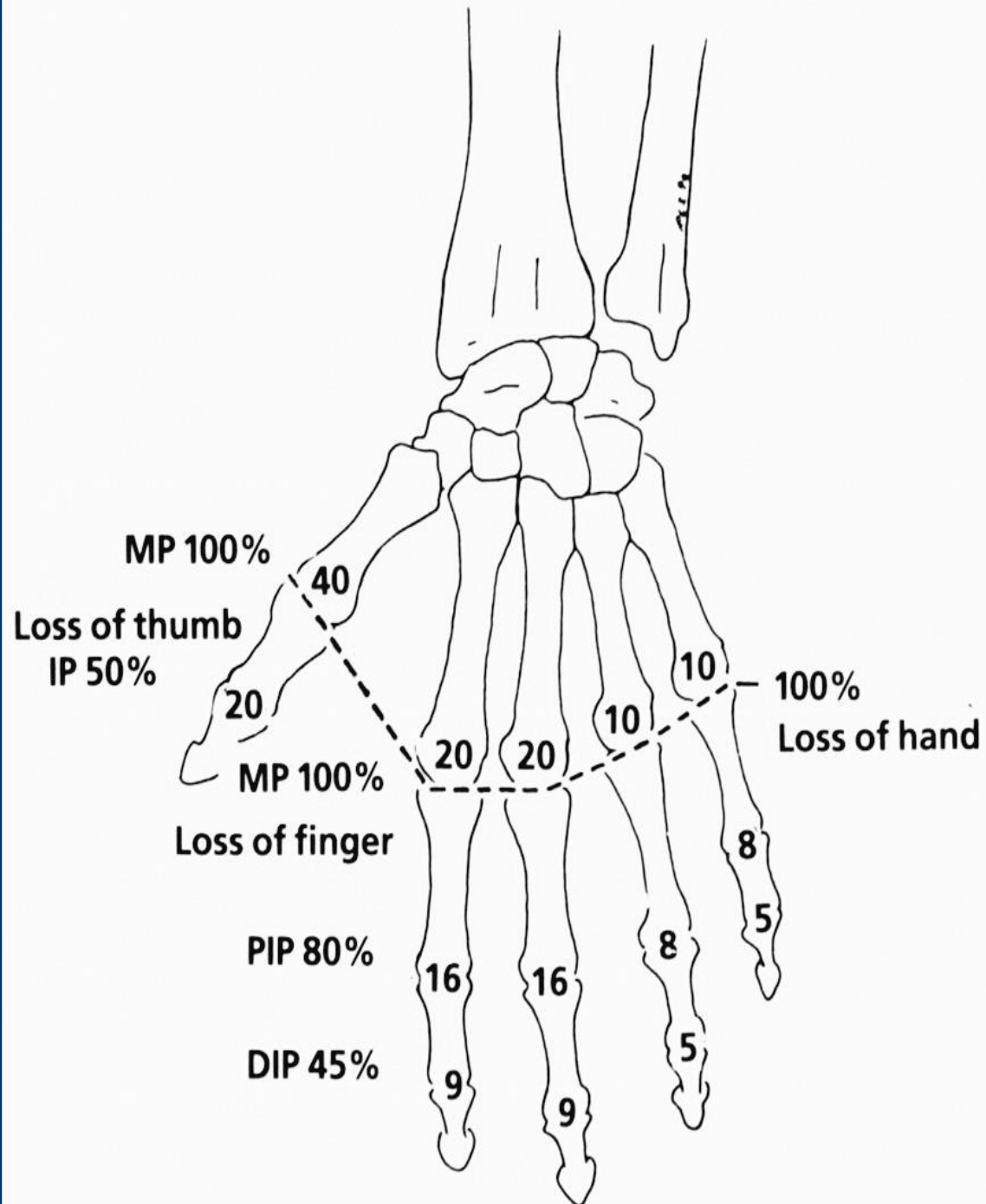
Figure 2, p. 18

Impairments of Upper Amputation at Various Levels

100% of extremity, or 60% of the whole person

95%

90%
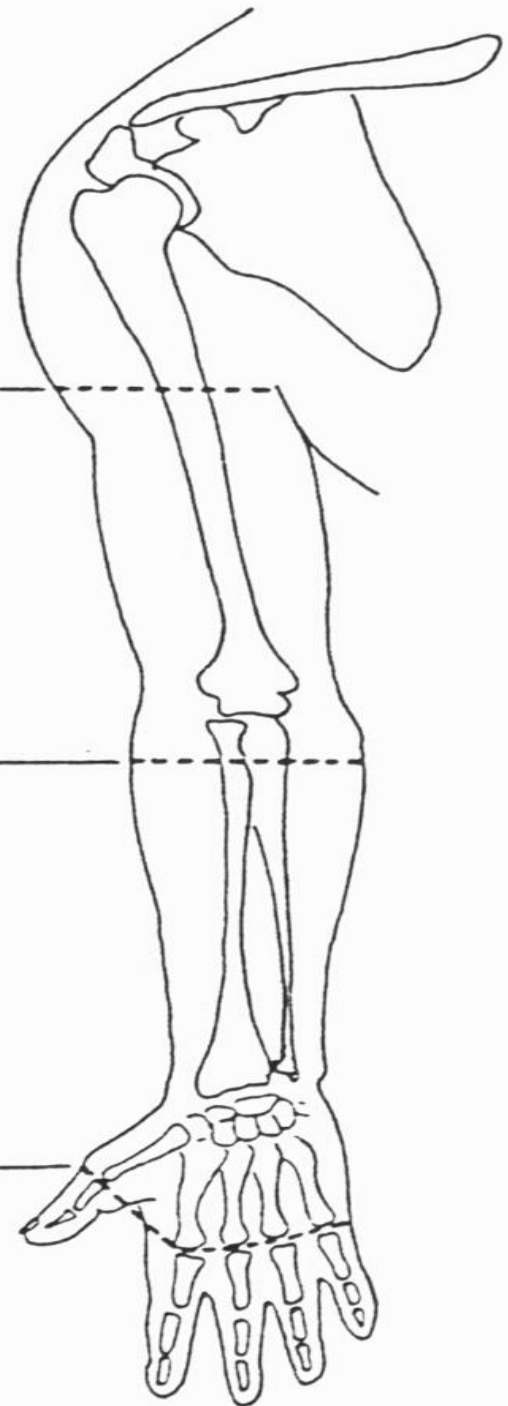
MMI/IR - Upper Extremity Case 2

History of Injury

25 y.o. male punch press operator 4 months ago accidentally amputated the tip of the left index finger with punch press machine.

MMI/IR - Upper Extremity Case 2

Treatment History

- He was seen in the ER, evaluated, and referred to a hand surgeon.

- A day later, he was taken to the OR for debridement.

- The operative report noted traumatic amputation of left index finger tip with complete loss of fingernail and most of the distal phalanx of the left index finger.

MMI/IR - Upper Extremity Case 2

Treatment History

- He was followed by him with adequate healing. There were 24 post op PT visits.
- He has returned to work with restrictions per his surgeon.
- The doctor also recommended

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MMI/IR – Upper Extremity Case 2

Designated Doctor exam 8 months post-injury

- Occasional swelling / aching left index

- Meds: Metformin / vicodin

- Well healed scar, no redness / swelling

- Absence tip / fingernail.

MMI/IR – Upper Extremity Case 2

Designated Doctor exam 8 months post-injury

- Amputation just distal to the DIP of the left index finger

- Transverse sensory loss tip of index finger - rest of hand intact

- Normal range of motion strength, sensation, neurovascular intact

MMI/IR - Upper Extremity Case 2

Designated Doctor Physical Exam

- Based on the medical records and your physical examination of the injured employee, what is the compensable injury for certifying MMI and IR?

MMI/IR – Upper Extremity Case 2

Question for designated doctor:

Has MMI been reached; if so, what is the date?

2. Has MMI been reached; if so, on what date?

A. No, not at MMI.
B. Yes, date of Designated Doctor Exam.
C. Yes, date he completed 24 visits to PT.
D. Yes, date last seen by his surgeon.

MMI/IR – Upper Extremity Case 2

Question for the Designated Doctor:

On the MMI date, what is the whole person IR?

Show your work!

3. On the Date of MMI, what is the whole person IR?

A. 30%

B. 6%

C. 5%

D. 3%

Finger Impairment

Amputation

- Compare length with Figure 17, p. 30

Convert using:

- **Table 1, p. 18**

- **Table 2, p. 19**

- **Table 3, p. 20**

Figure 17. Finger Impairment Due to Amputation at Various Lengths (top Scale) and Total Transverse Sensory Loss (bottom scale). Total transverse sensory loss impairments correspond to 50% of amputation impairment.

Finger impairment

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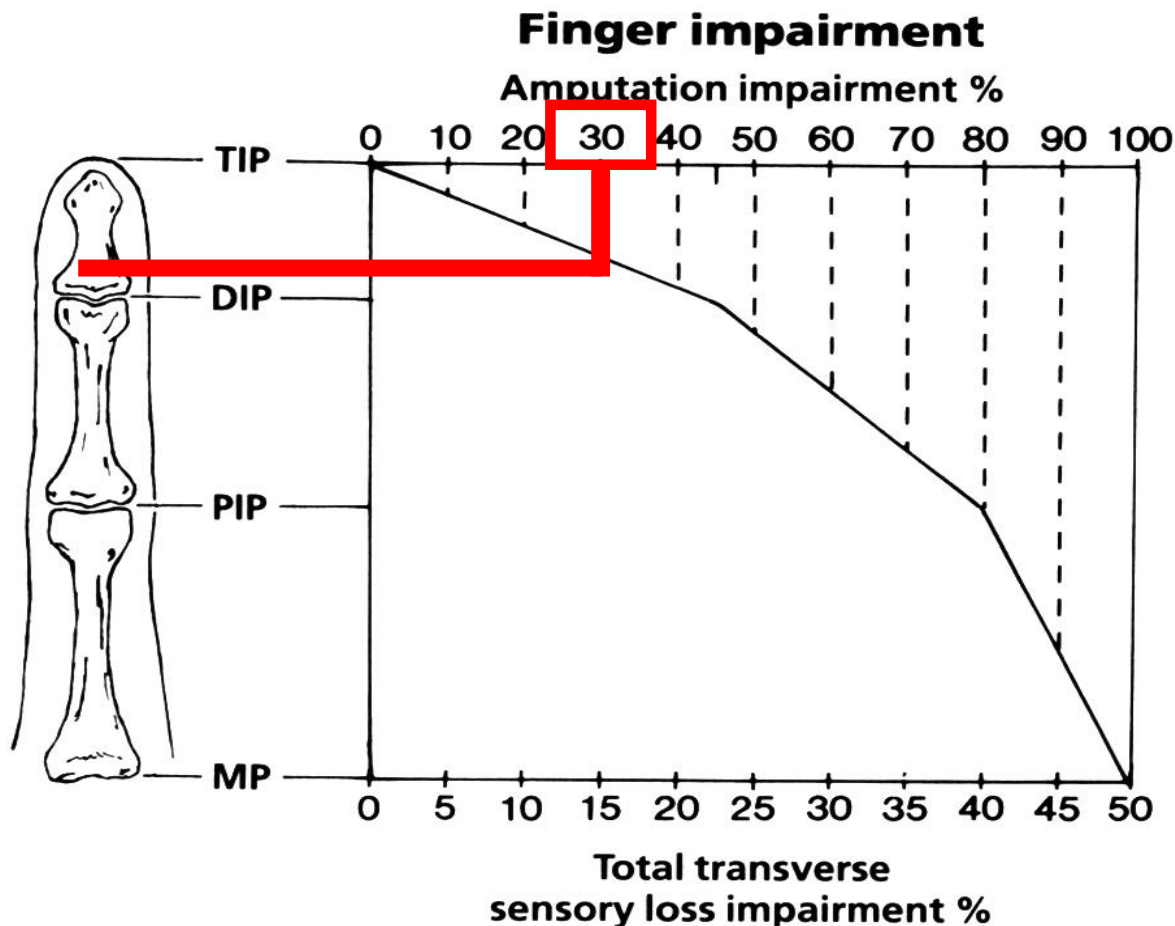
Whole Person Concept
Upper Extremity
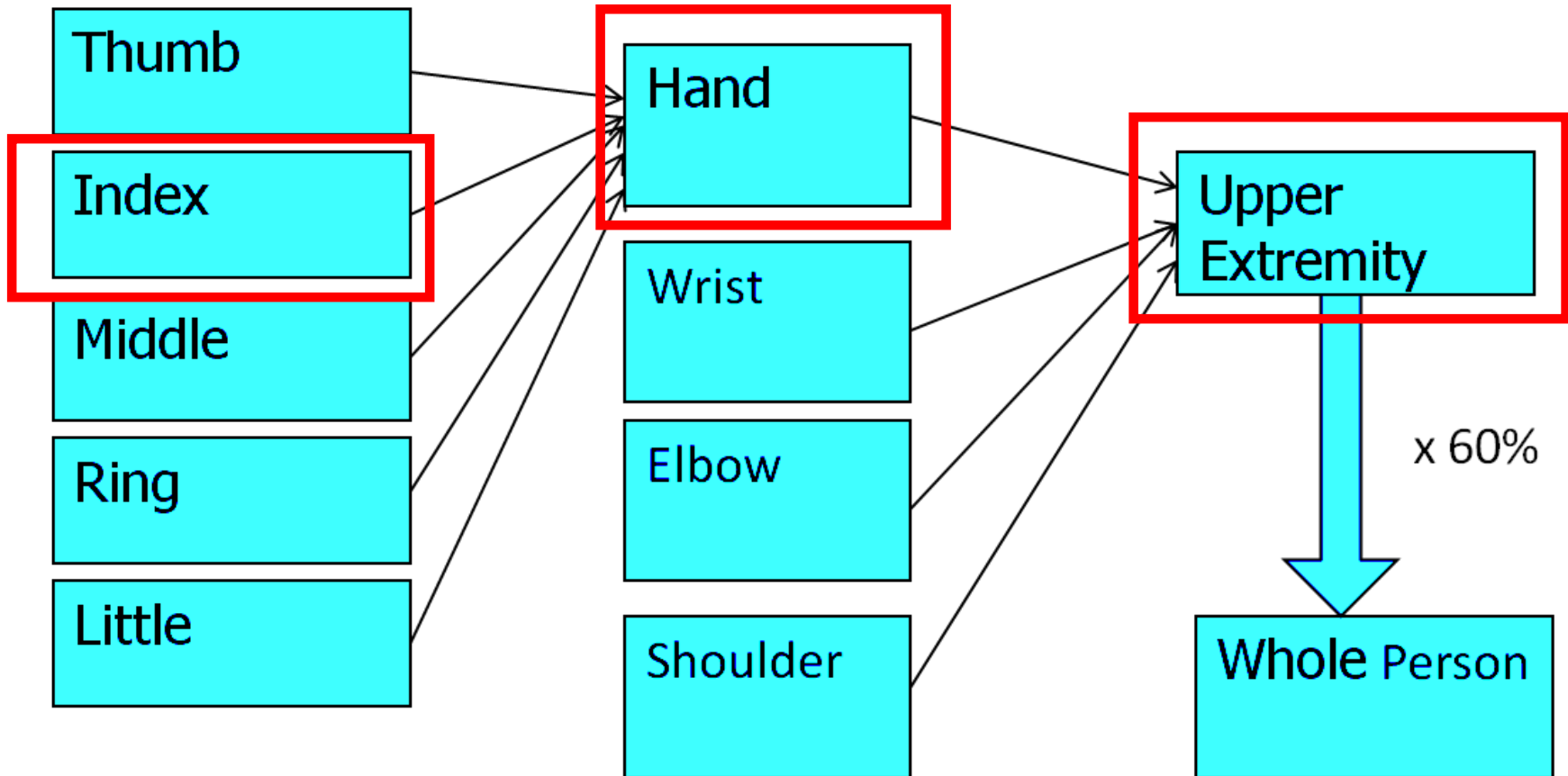
Convert using:

T. 1 (P. 3/18) -

Digit to Hand

30% Index

Impairment

= 6% Hand

% Impairment of			% Impairment of			% Impairment of		
Thumb		**Hand**	**Index or middle finger**		**Hand**	**Ring or little finger**		**Hand**
0 -	1	= 0	0 -	2	= 0	0 -	4	= 0
2 -	3	= 1	3 -	7	= 1	5 -	14	= 1
4 -	6	= 2	8 -	12	= 2	15 -	24	= 2
7 -	8	= 3	13 -	17	= 3	25 -	34	= 3
9 -	11	= 4	18 -	22	= 4	35 -	44	= 4
12 -	13	= 5	23 -	27	= 5	45 -	54	= 5
14 -	16	= 6	28 -	32	= 6	55 -	64	= 6
17 -	18	= 7	33 -	37	= 7	65 -	74	= 7
19 -	21	= 8	38 -	42	= 8	75 -	84	= 8
22 -	23	= 9	43 -	47	= 9	85 -	94	= 9
24 -	26	= 10	48 -	52	= 10	95 - 100		= 10
27 -	28	= 11	53 -	57	= 11			
29 -	31	= 12	58 -	62	= 12			
32 -	33	= 13	63 -	67	= 13			
34 -	36	= 14	68 -	72	= 14			
37 -	38	= 15	73 -	77	= 15			
39 -	41	= 16	78 -	82	= 16			
42 -	43	= 17	83 -	87	= 17			
44 -	46	= 18	88 -	92	= 18			
47 -	48	= 19	93 -	97	= 19			
49 -	51	= 20	98 - 100		= 20			
52 -	53	= 21						
54 -	56	= 22						
57 -	58	= 23						
59 -	61	= 24						
62 -	63	= 25						
64 -	66	= 26						
67 -	68	= 27						
69 -	71	= 28						
72 -	73	= 29						
74 -	76	= 30						
77 -	78	= 31						
79 -	81	= 32						
82 -	83	= 33						
84 -	86	= 34						
87 -	88	= 35						
89 -	91	= 36						
92 -	93	= 37						
94 -	96	= 38						
97 -	98	= 39						
99 - 100		= 40						

*See Table 2 (p. 19) for converting hand impairment to upper extremity impairment.

Using Table 2 to Convert
6% Hand = 5% Upper Extremity

Table 2. Relationship of Impairment of the Hand to Impairment of the Upper Extremity.*

% Impairment of		% Impairment of		% Impairment of		% Impairment of		% Impairment of		% Impairment of	
Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity	Hand	Upper extremity
0 = 0		18 = 16		35 = 32		53 = 48		70 = 63		88 = 79	
1 = 1		19 = 17		36 = 32		54 = 49		71 = 64		89 = 80	
2 = 2				37 = 33				72 = 65			
3 = 3		20 = 18		38 = 34		55 = 50		73 = 66		90 = 81	
4 = 4		21 = 19		39 = 35		56 = 50		74 = 67		91 = 82	
		22 = 20				57 = 51				92 = 83	
5 = 5		23 = 21		40 = 36		58 = 52		75 = 68		93 = 84	
6 = 5		24 = 22		41 = 37		59 = 53		76 = 68		94 = 85	
7 = 6				42 = 38				77 = 69			
8 = 7		25 = 23		43 = 39		60 = 54		78 = 70		95 = 86	
9 = 8		26 = 23		44 = 40		61 = 55		79 = 71		96 = 86	
10 = 9		27 = 24		45 = 41		62 = 56		80 = 72		97 = 87	
11 = 10		28 = 25		46 = 41		63 = 57		81 = 73		98 = 88	
12 = 11		29 = 26		47 = 42		64 = 58		82 = 74		99 = 89	
13 = 12				48 = 43				83 = 75			
14 = 13		30 = 27		49 = 44		65 = 59		84 = 76		100 = 90	
		31 = 28				66 = 59					
15 = 14		32 = 29		50 = 45		67 = 60		85 = 77			
16 = 14		33 = 30		51 = 46		68 = 61		86 = 77			
17 = 15		34 = 31		52 = 47		69 = 62		87 = 78			

*Consult Table 3 (p. 20) to convert upper extremity impairment to whole-person impairment.

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Using Table 3 to Convert 5% Upper Extremity to 3% Whole Person

% Impairment of			% Impairment of			% Impairment of		
Upper extremity		Whole person	Upper extremity		Whole person	Upper extremity		Whole person
0	=	0	35	=	21	70	=	42
1	=	1	36	=	22	71	=	43
2	=	1	37	=	22	72	=	43
3	=	2	38	=	23	73	=	44
4	=	2	39	=	23	74	=	44
5	=	3	40	=	24	75	=	45
6	=	4	41	=	25	76	=	46
7	=	4	42	=	25	77	=	46
8	=	5	43	=	26	78	=	47
9	=	5	44	=	26	79	=	47
10	=	6	45	=	27	80	=	48
11	=	7	46	=	28	81	=	49
12	=	7	47	=	28	82	=	49
13	=	8	48	=	29	83	=	50
14	=	8	49	=	29	84	=	50
15	=	9	50	=	30	85	=	51
16	=	10	51	=	31	86	=	52
17	=	10	52	=	31	87	=	52
18	=	11	53	=	32	88	=	53
19	=	11	54	=	32	89	=	53
20	=	12	55	=	33	90	=	54
21	=	13	56	=	34	91	=	55
22	=	13	57	=	34	92	=	55
23	=	14	58	=	35	93	=	56
24	=	14	59	=	35	94	=	56
25	=	15	60	=	36	95	=	57
26	=	16	61	=	37	96	=	58
27	=	16	62	=	37	97	=	58
28	=	17	63	=	38	98	=	59
29	=	17	64	=	38	99	=	59
30	=	18	65	=	39	100	=	60
31	=	19	66	=	40			
32	=	19	67	=	40			
33	=	20	68	=	41			
34	=	20	69	=	41			

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Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand)   Side ☐ R ☑ L

Name _PAUL PRESTON_   Age _25_   Sex ☑ M ☐ F   Dominant hand ☑ R ☐ L   Date _XX/XX/XXXX_

Occupation _PUNCH PRESS OPERATOR_   Diagnosis _TRAUMATIC Amputation Tip of (L)_

			Abnormal motion				Amputation	Sensory loss	Other disorders	Hand impairment%
			Record motion, ankylosis, and impairment %				Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%
Thumb			Flexion	Extension	Ankylosis	IMP%				
	IP	Angle°								
		IMP%								
	MP	Angle°								
		IMP%								
			Motion	Ankylosis	IMP%					
	CMC	Radial abduction	Angle°							Abnormal motion [1]
			IMP%							Amputation [2]
		Adduction	CMS							Sensory loss [3]
			IMP%							Other disorders [4]
		Opposition	CMS				R L	R L		Digit impairment % • Combine 1, 2, 3, 4
			IMP%							
	Add impairment % CMC + MP + IP =					[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	Hand impairment % *Convert above

			Flexion	Extension	Ankylosis	IMP%				
Index	DIP	Angle°	———							Abnormal motion [1]	O
		IMP%								Amputation [2]	30
	PIP	Angle°	———	———						Sensory loss [3]	—
		IMP%	———	———						Other disorders [4]	—
	MP	Angle°	——	——						Digit impairment % • Combine 1, 2, 3, 4	30
		IMP%	——	——						
• Combine impairment % MP + PIP + DIP =			O %			[1]	IMP % = 30 [2]	IMP % = [3]	IMP % = [4]	Hand impairment % *Convert above	6

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Figure 1, pp. 16-17

Total hand impairment (Add hand impairment % for thumb + index + ring + little finger) = 6%
Upper extremity impairment (+Convert total impairment % to upper extremity impairment %) = 5%; enter on Part 2, Line II
If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment= 3%

*Combined Values Chart; (p. 322-324) *Use Table 1 (1Digits to hand p. 18); *Use Table 2 (Hand to upper extremity p. 19) * Use Table 3 (p. 20)
**Courtesy of G. de Groot Swanson, MD

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Questions about amputation?
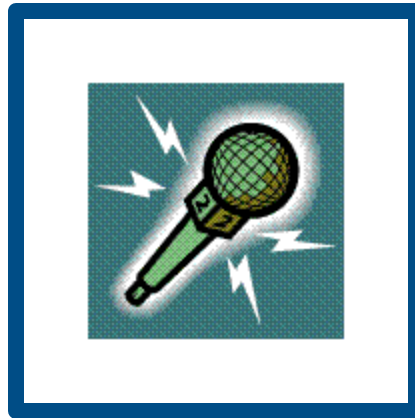
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Hand and Upper Extremity Methods for Evaluating Impairment

- Amputation
- **Sensory loss of digits**
- ROM
- Peripheral nerve disorders
  - Cervical Spinal Nerve Roots
  - Brachial Plexus
  - Major Peripheral Nerves
- Vascular Disorders
- "Other Disorders"

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Sensory loss of digits

- Must be unequivocal and permanent, p. 20

- **Dorsal surface not considered impairing**

Sensory loss of digits

"Impairments are estimated according to the sensory quality and its distribution on the PALMAR aspect of the digits. Sensory loss on the DORSAL surface of the digits is NOT considered to be an impairment." p.

Sensory loss of digits

Determine Quality of Loss, p. 21

- Determine by two-point exam

- \> 15 mm = **total** sensory loss, 100% sensory impairment

- 15 mm through 7 mm = **partial** sensory loss, 50% sensory impairment

- <u><</u> 6mm is **normal**, 0% sensory impairment

Figure 4, p. 21

Figure 4. Two-Point Discrimination Test for Determining Sensory Loss.
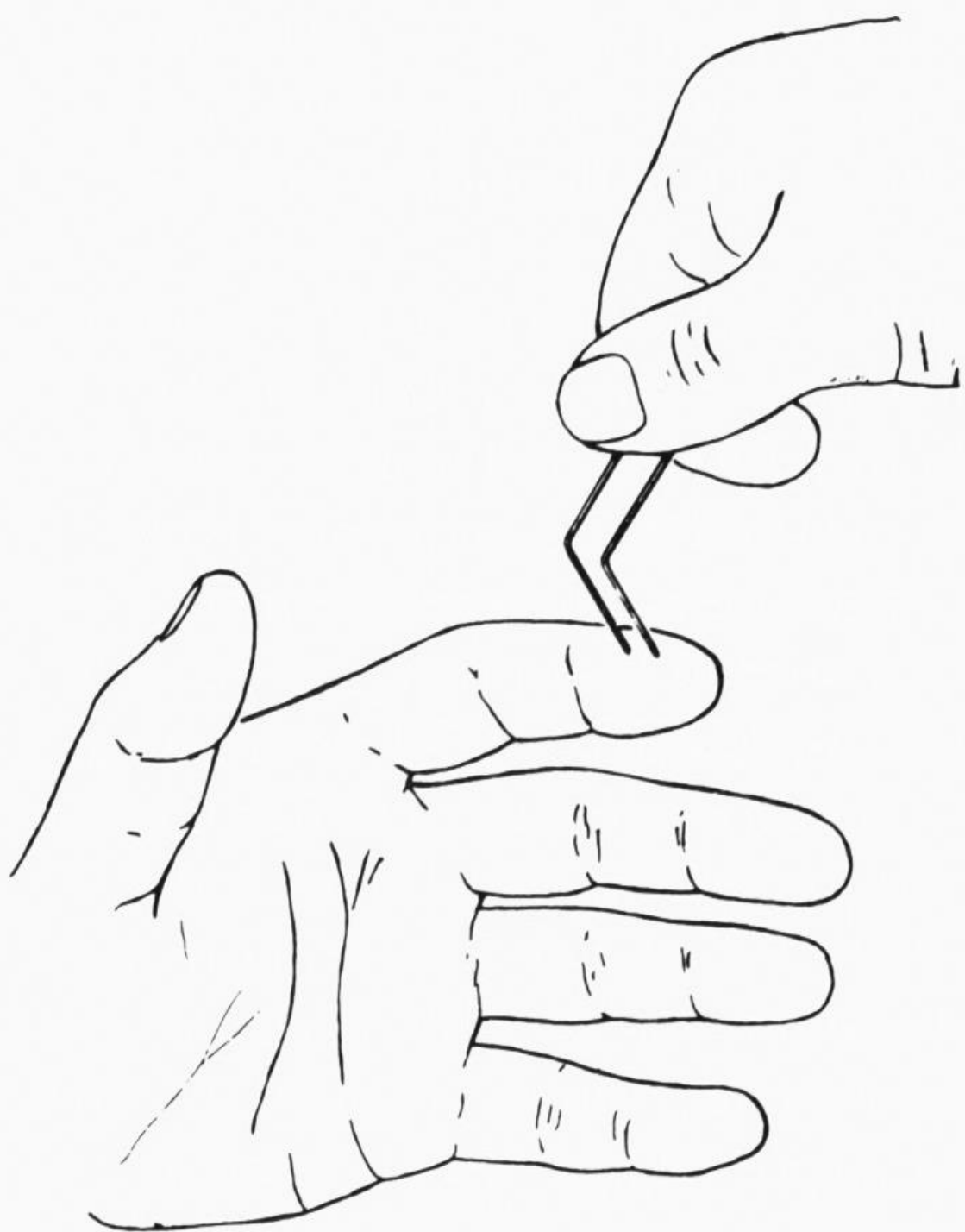
Sensory loss of digits

Different Types:

1) **Transverse Loss**
   a. Loss of function in **both digital nerves**
   b. 100% sensory loss and receive 50% value of amputation at that level
   c. Thumb - Figure 7, p. 24
   d. Fingers - Figure 17, p. 30

Impairment of Thumb Due to Amputation at Various Levels or Total Transverse Sensory Loss.

Thumb impairment
Amputation impairment %

Division of Workers' Compensation
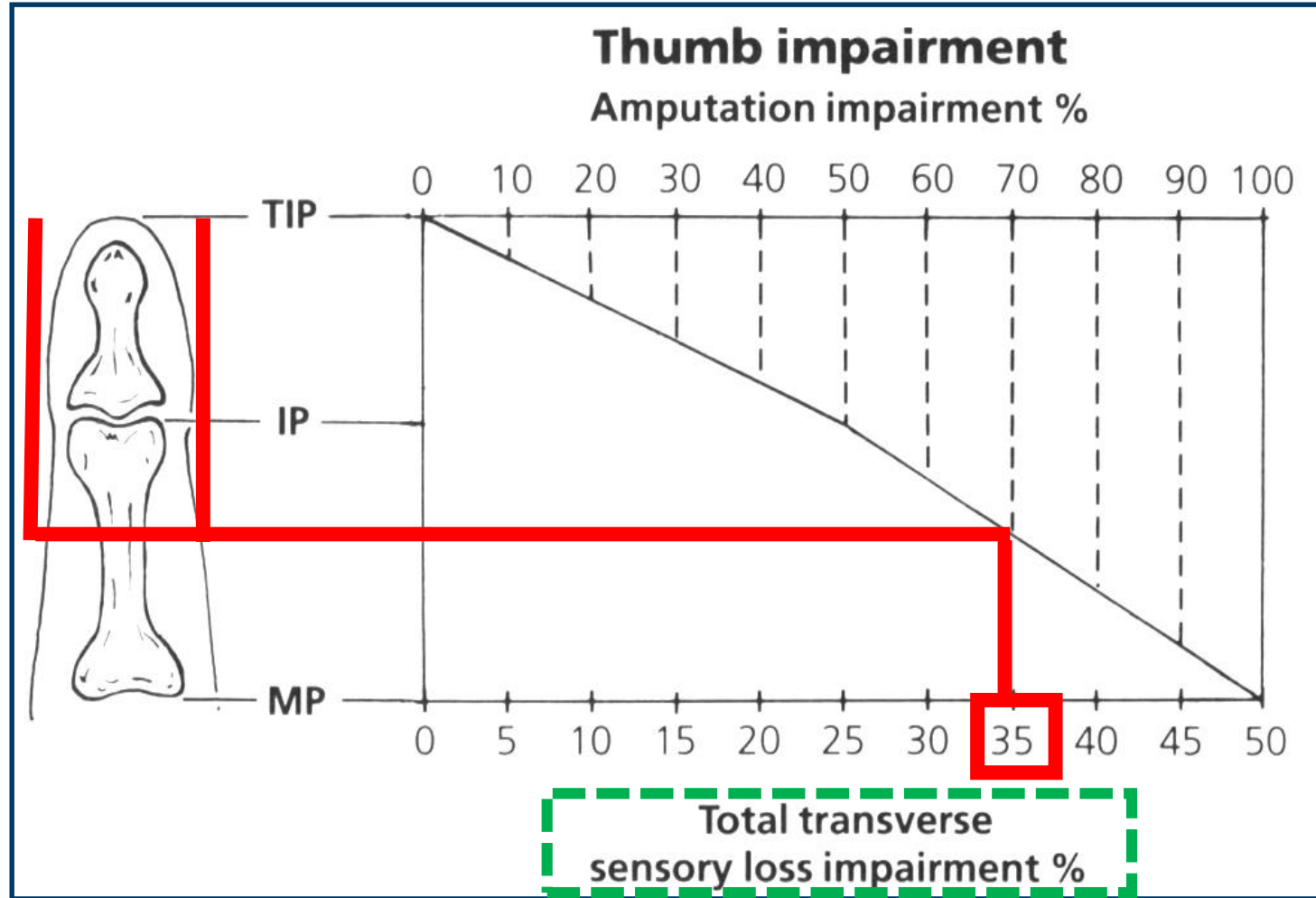
Figure 17, p. 30

Finger Impairment Due to Amputation at Various Lengths and Total Transverse Sensory Loss.

Figure 17. Finger Impairment Due to Amputation at Various Lengths (top scale) and Total Transverse Sensory Loss (bottom scale). Total transverse sensory loss impairments correspond to 50% of amputation impairments.*
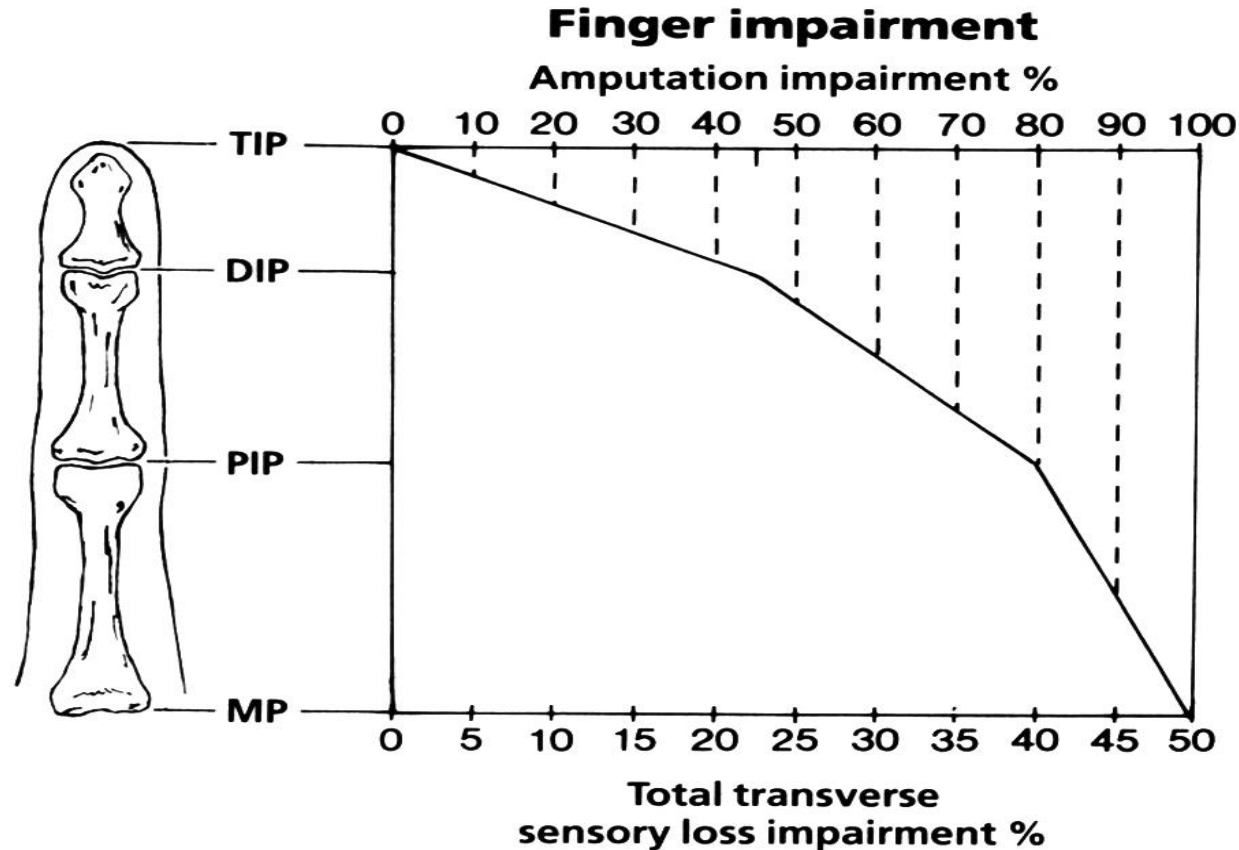
*Redrawn with permission from Swanson, AB[34], p. 927, Fig. 2.

Sensory loss of digits

Different Types:

2) **Longitudinal Loss**
   a. **One** Digital Nerve
   b. Impairment value varies as to side injured (radial vs. ulnar side of digit)
   c. Be sure to read sections on proper use of Tables
   d. Thumb/little – T. 4, P.25 and T. 8, P. 31
   e. Index, middle, ring – T. 9, P. 31

Longitudinal Sensory Loss Impairment for *Thumb* and *little Finger* Based on Percent of Digit Length Involved.

% of digit length	Longitudinal sensory loss %				
	Ulnar digital nerve			Radial digital nerve	
	Total loss	Partial loss		Total loss	Partial loss
100	30	15		20	10
90	27	14		18	9
80	24	12		16	8
70	21	11		14	7
60	18	9		12	6
50	15	8		10	5
40	12	6		8	4
30	9	5		6	3
20	6	3		4	2
10	3	2		2	1

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Table 8, P. 31

Longitudinal Sensory Loss Impairment for the *Thumb* and *Little Finger* Based on Percent of Digit Length Involved.

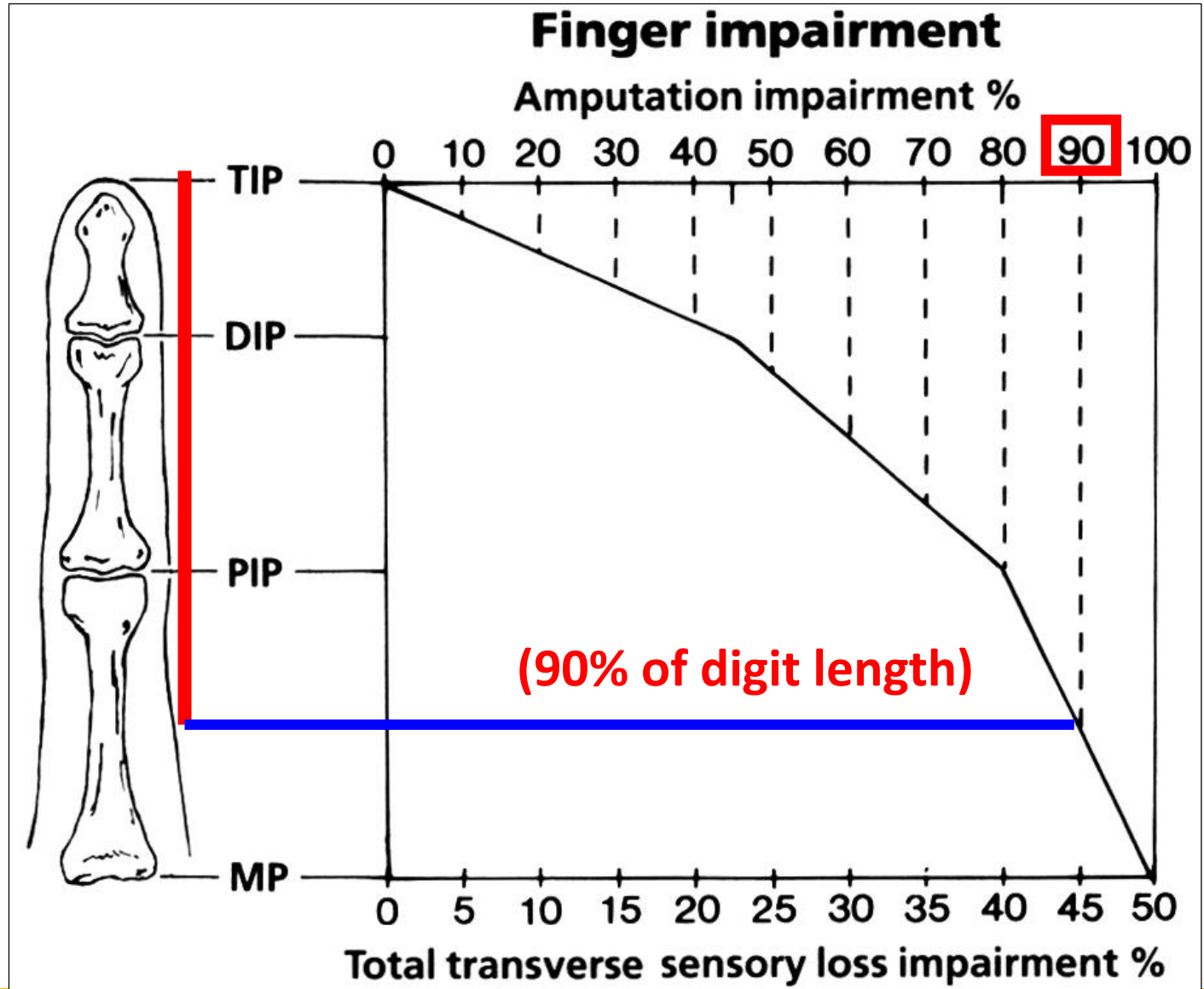**Table 8.** Longitudinal Sensory Loss Impairment for the *Thumb* and *Little Finger* Based on Percent of Digit Length Involved (values are expressed as percent of digit impairment).

| Percent of digit length | Longitudinal sensory loss % | | | |
| | Ulnar digital nerve | | Radial digital nerve | |
	Total loss	Partial loss	Total loss	Partial loss
100	30	15	20	10
90	27	14	18	9
80	24	12	16	8
70	21	11	14	7
60	18	9	12	6
50	15	8	10	5
40	12	6	8	4
30	9	5	6	3
20	6	3	4	2
10	3	2	2	1

Table 9, P. 31

Longitudinal Sensory Loss Impairment for the *Index, Middle* and *Ring Finger* Based on Percent of Digit Length Involved.

Table 9. Longitudinal Sensory Loss Impairment of *Index, Middle*, and *Ring Fingers* Based on the Percent of Digit Length Involved (values are expressed as percent of finger impairment).

	Longitudinal sensory loss (%)			
	Ulnar digital nerve		Radial digital nerve	
Percent of digit length	Total loss	Partial loss	Total loss	Partial loss
100	20	10	30	15
90	18	9	27	14
80	16	8	24	12
70	14	7	21	11
60	12	6	18	9
50	10	5	15	8
40	8	4	12	6
30	6	3	9	5
20	4	2	6	3
10	2	1	3	2

Sensory loss of digits

Total Transverse and Longitudinal Sensory Loss

- Can be rated using Figure 5, p. 22

- Can be easier to rate using Fig. 7 and Fig. 17 (total transverse sensory loss) and T. 4, T. 8, and T. 9 (longitudinal sensory loss)

Figure 5, P. 22

- Can be confusing

- Rarely used

- Use Fig. 7 and Fig. 17 (total transverse sensory loss) and T. 4, T. 8, and T. 9 (longitudinal sensory loss)

Impairment of Hand Due to Total Transverse Sensory Loss of Digits (numbers at tips of digits) and Longitudinal Sensory Loss of Radial and Ulnar Sides of the Digits
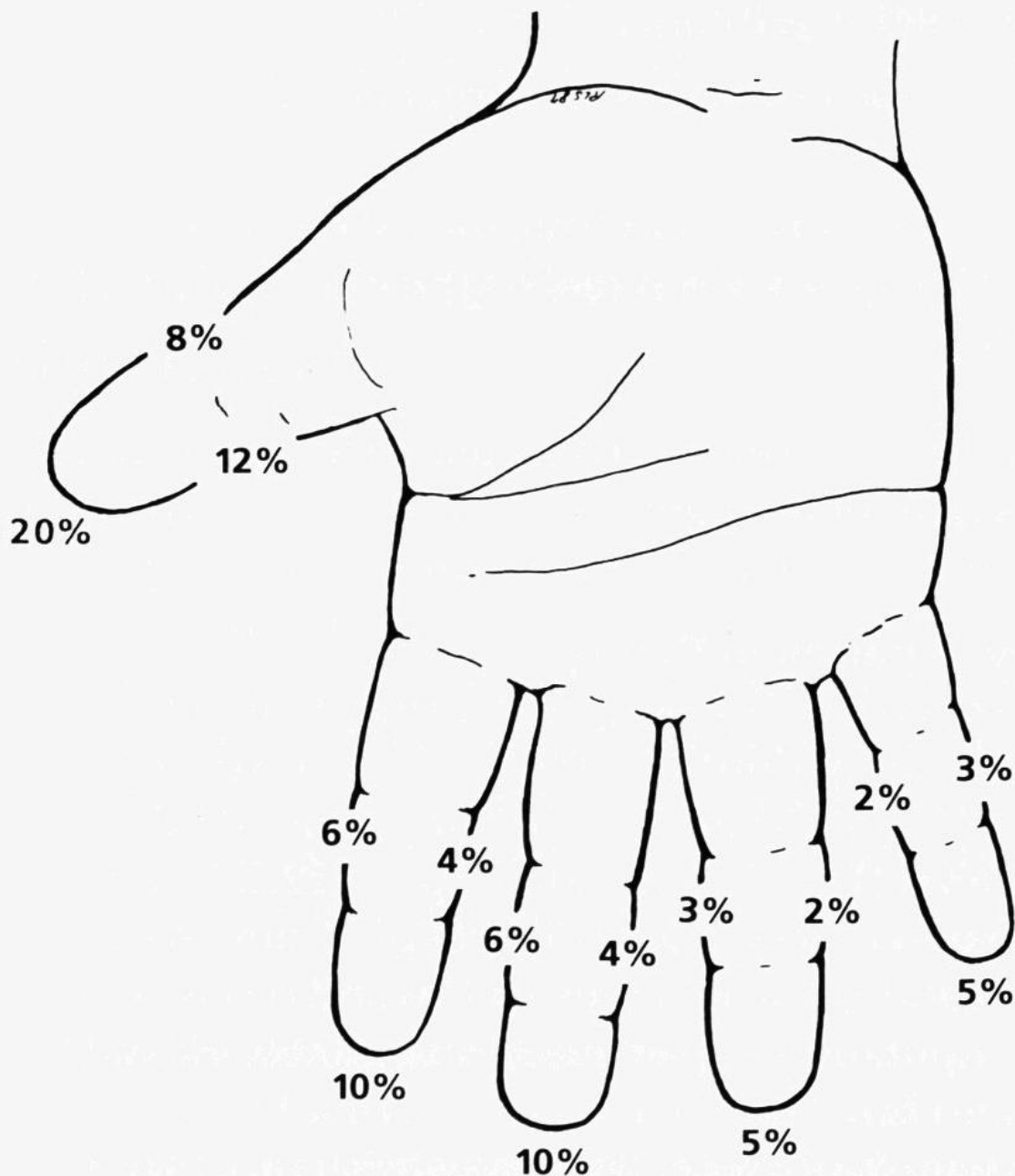
Upper Extremity Case 3 MMI/IR

History of Injury

- 25 year old chef sustained a laceration to the radial aspect of his left index finger while slicing meat.

- He was seen at a local emergency department where the wound was irrigated and debrided.

- The wound healed without complication, and he returned to work.

Upper Extremity Case 3 MMI/IR

The IE reached statutory MMI and a designated doctor examination was requested.

Designated Doctor Physical Exam

- Well healed scar between the PIP and MP of the left index finger with 12 mm 2 point discrimination on the radial side of the left index finger.

Upper Extremity Case 3 MMI/IR

Designated Doctor Physical Exam

Full ROM of the index finger

5/5 strength of the fingers and wrist

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MMI/IR - Upper Extremity Case 3

Designated Doctor Physical Examination

- Based on the medical records and your physical examination of the injured employee, what is the compensable injury for certifying MMI and IR?

MMI/IR – Upper Extremity Case 3

Question for the Designated Doctor:

On the MMI date, what is the whole person IR?

Show your work!

4. On the Date of MMI, what is the whole person IR?

A. 14%

B. 3%

C. 2%

D. 1%

Problem solution:

Length = 90% digit

Radial side only – Transverse or Longitudinal?

LONGITUDINAL

12mm sensory loss – Total or Partial?

PARTIAL – use **T. 9, P. 31**

Measure length of sensory loss

(90% of digit length)

T. 9, P. 31

- Left index finger
- **radial** digital nerve longitudinal loss
- 90% digit length
- 12 mm = partial loss 14% digit impairment

Table 9. Longitudinal Sensory Loss Impairment of *Index*, *Middle*, and *Ring Fingers* Based on the Percent of Digit Length Involved (values are expressed as percent of finger impairment).

| Percent of digit length | Longitudinal sensory loss (%) | | | |
| | Ulnar digital nerve | | Radial digital nerve | |
	Total loss	Partial loss	Total loss	Partial loss
100	20	10	30	15
90	18	9	27	14
80	16	8	24	12
70	14	7	21	11
60	12	6	18	9
50	10	5	15	8
40	8	4	12	6
30	6	3	9	5
20	4	2	6	3
10	2	1	3	2

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Using
T. 1, P. 18,
Convert Digit
to Hand

14% Index
Impairment
= 3% Hand

% Impairment of Thumb	Hand	% Impairment of Index or middle finger	Hand	% Impairment of Ring or little finger	Hand
0- 1	0	0- 2	0	0- 4	0
2- 3	1	3- 7	1	5- 14	1
4- 6	2	8- 12	2	15- 24	2
7- 8	3	13- 17	3	25- 34	3
9- 11	4	18- 22	4	35- 44	4
12- 13	5	23- 27	5	45- 54	5
14- 16	6	28- 32	6	55- 64	6
17- 18	7	33- 37	7	65- 74	7
19- 21	8	38- 42	8	75- 84	8
22- 23	9	43- 47	9	85- 94	9
24- 26	10	48- 52	10	95-100	10
27- 28	11	53- 57	11		
29- 31	12	58- 62	12		
32- 33	13	63- 67	13		
34- 36	14	68- 72	14		
37- 38	15	73- 77	15		
39- 41	16	78- 82	16		
42- 43	17	83- 87	17		
44- 46	18	88- 92	18		
47- 48	19	93- 97	19		
49- 51	20	98-100	20		
52- 53	21				
54- 56	22				
57- 58	23				
59- 61	24				
62- 63	25				
64- 66	26				
67- 68	27				
69- 71	28				
72- 73	29				
74- 76	30				
77- 78	31				
79- 81	32				
82- 83	33				
84- 86	34				
87- 88	35				
89- 91	36				
92- 93	37				
94- 96	38				
97- 98	39				
99-100	40				

*See Table 2 (p. 19) for converting hand impairment to upper
 extremity impairment.

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Using Table 2, p. 19, Convert 3% Hand = *3% Upper Extremity*

Table 2. Relationship of Impairment of the Hand to Impairment of the Upper Extremity.*

Hand		Upper extremity	Hand		Upper extremity	Hand		Upper extremity	Hand		Upper extremity	Hand		Upper extremity	Hand		Upper extremity
0	=	0	18	=	16	35	=	32	53	=	48	70	=	63	88	=	79
1	=	1	19	=	17	36	=	32	54	=	49	71	=	64	89	=	80
2	=	2				37	=	33				72	=	65			
3	=	3	20	=	18	38	=	34	55	=	50	73	=	66	90	=	81
4	=	4	21	=	19	39	=	35	56	=	50	74	=	67	91	=	82
			22	=	20				57	=	51				92	=	83
5	=	5	23	=	21	40	=	36	58	=	52	75	=	68	93	=	84
6	=	5	24	=	22	41	=	37	59	=	53	76	=	68	94	=	85
7	=	6				42	=	38				77	=	69			
8	=	7	25	=	23	43	=	39	60	=	54	78	=	70	95	=	86
9	=	8	26	=	23	44	=	40	61	=	55	79	=	71	96	=	86
10	=	9	27	=	24	45	=	41	62	=	56	80	=	72	97	=	87
11	=	10	28	=	25	46	=	41	63	=	57	81	=	73	98	=	88
12	=	11	29	=	26	47	=	42	64	=	58	82	=	74	99	=	89
13	=	12				48	=	43				83	=	75			
14	=	13	30	=	27	49	=	44	65	=	59	84	=	76	100	=	90
			31	=	28				66	=	59						
15	=	14	32	=	29	50	=	45	67	=	60	85	=	77			
16	=	14	33	=	30	51	=	46	68	=	61	86	=	77			
17	=	15	34	=	31	52	=	47	69	=	62	87	=	78			

*Consult Table 3 (p. 20) to convert upper extremity impairment to whole-person impairment.

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Using Table 3, p. 20, Convert:

- **3% Upper Extremity = 2% Whole Person**

% Impairment of		% Impairment of		% Impairment of	
Upper extremity	Whole person	Upper extremity	Whole person	Upper extremity	Whole person
0 = 0		35 = 21		70 = 42	
1 = 1		36 = 22		71 = 43	
2 = 1		37 = 22		72 = 43	
3 = 2		38 = 23		73 = 44	
4 = 2		39 = 23		74 = 44	
5 = 3		40 = 24		75 = 45	
6 = 4		41 = 25		76 = 46	
7 = 4		42 = 25		77 = 46	
8 = 5		43 = 26		78 = 47	
9 = 5		44 = 26		79 = 47	
10 = 6		45 = 27		80 = 48	
11 = 7		46 = 28		81 = 49	
12 = 7		47 = 28		82 = 49	
13 = 8		48 = 29		83 = 50	
14 = 8		49 = 29		84 = 50	
15 = 9		50 = 30		85 = 51	
16 = 10		51 = 31		86 = 52	
17 = 10		52 = 31		87 = 52	
18 = 11		53 = 32		88 = 53	
19 = 11		54 = 32		89 = 53	
20 = 12		55 = 33		90 = 54	
21 = 13		56 = 34		91 = 55	
22 = 13		57 = 34		92 = 55	
23 = 14		58 = 35		93 = 56	
24 = 14		59 = 35		94 = 56	
25 = 15		60 = 36		95 = 57	
26 = 16		61 = 37		96 = 58	
27 = 16		62 = 37		97 = 58	
28 = 17		63 = 38		98 = 59	
29 = 17		64 = 38		99 = 59	
30 = 18		65 = 39		100 = 60	
31 = 19		66 = 40			
32 = 19		67 = 40			
33 = 20		68 = 41			
34 = 20		69 = 41			

Figure 1, Case 3

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand)   Side ☐ R ☐ L

Name _MR. COOK_   Age _____   Sex ☒ M ☐ F   Dominant hand ☐ R ☐ L   Date _____

Occupation _Chef_   Diagnosis _LACERATION_

Abnormal motion					Amputation	Sensory loss	Other disorders	Hand Impairment%
Record motion, ankylosis, and impairment %					Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	+ Combine digit IMP% *Convert to hand IMP%

Index finger: Other disorders section notes: *12 mm*, *90% Length*

Sensory loss [3] = 14, Digit impairment % Combine 1,2,3,4 = 14, Hand Impairment % Convert above = 3

Middle finger IMP % = 14 (Sensory loss [3])

Total hand impairment (Add hand impairment % for thumb + index + middle + ring + little finger) = 3

Upper extremity impairment (*Convert total hand impairment % to upper extremity impairment %) = 3 %; enter on Part 2, Line 8

If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment = 2 %

+ Combined Values Chart; (p. 322-324)   *Use Table 1 (Digits to hand p. 18);   +Use Table 2 (Hand to upper extremity p. 19)   +Use Table 3 (p. 20)

++ Courtesy of G. de Groot Swanson, MD

Figure 1, Case 3

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand)   Side ☐ R ☐ L

Name: MR. COOK   Age: Sex ☑ M ☐ F   Dominant hand ☐ R ☐ L   Date:

Occupation: Chef   Diagnosis: LACERATION

Abnormal motion					Amputation	Sensory loss	Other disorders	Hand impairment%
Record motion, ankylosis, and impairment %					Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%

Thumb

		Flexion	Extension	Ankylosis	IMP%
IP	Angle°				
IP	IMP%				
MP	Angle°				
MP	IMP%				

			Motion	Ankylosis	IMP%
CMC	Radial abduction	Angle°			
CMC	Radial abduction	IMP%			
CMC	Adduction	CMS			
CMC	Adduction	IMP%			
CMC	Opposition	CMS			
CMC	Opposition	IMP%			

Add impairment %   CMC + MP + IP =   [1]

R   L   R   L

Abnormal motion	[1]	
Amputation	[2]	
Sensory loss	[3]	
Other disorders	[4]	
Digit impairment % • Combine 1, 2, 3, 4		

[2] IMP % =   [3] IMP % =   [4] IMP % =   Hand impairment % *Convert above

Index

		Flexion	Extension	Ankylosis	IMP%
DIP	Angle°				
DIP	IMP%				
PIP	Angle°				
PIP	IMP%				
MP	Angle°				
MP	IMP%				

12mm   90% Length

Abnormal motion	[1]	—
Amputation	[2]	—
Sensory loss	[3]	14
Other disorders	[4]	—
Digit impairment % • Combine 1, 2, 3, 4		14

• Combine impairment %   MP + PIP + DIP =   [1]

[2] IMP % =   [3] IMP % = 14   [4] IMP % =   Hand Impairment % *Convert above   3

DIP	Angle°	
DIP	IMP%	

Abnormal motion	[1]	
Amputation	[2]	

Figure 1, Case 3

Total hand impairment (Add hand impairment % for thumb + index + ring + little finger) = 3%
Upper extremity impairment (+Convert total impairment % to upper extremity impairment %) = 3%; enter on Part 2, Line II
If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment+= 2%
*Combined Values Chart; (p. 322-324) *Use Table 1 (1Digits to hand p. 18); *Use Table 2 (Hand to upper extremity p. 19) * Use Table 3 (p. 20) **Courtesy of G. de Groot Swanson, MD

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Questions about sensory of the digits?
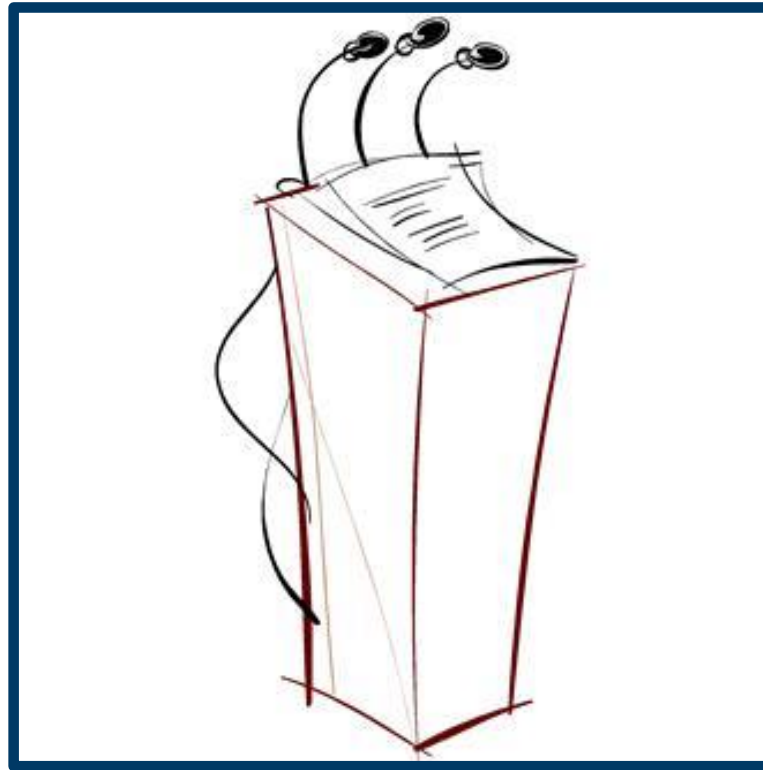
Hand and Upper Extremity Methods for Evaluating Impairment

- Amputation
- Sensory loss of digits
- **ROM**
- Peripheral nerve disorders
  - Cervical Spinal Nerve Roots
  - Brachial Plexus
  - Major Peripheral Nerves
- Vascular Disorders
- "Other Disorders"

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Hand and Upper Extremity Range of Motion

- Most values are recorded in degrees of motion as measured with a goniometer with a corresponding pie chart.

- Thumb adduction, opposition, and radial abduction are the exceptions (Figures 9, 12, 14, and 16 on pp 26-29

Hand and Upper Extremity Range of Motion

- **Round UE ROM to nearest 10° per written instructions AMA *Guides* 4th ed., pp. 25-44.**

- Appeals Panel decision 022504-s, decided November 12, 2002 affirmed rounding to nearest 10°.

J00203

J00205

ACUMAR

J00225

J00240

J00245

J00210
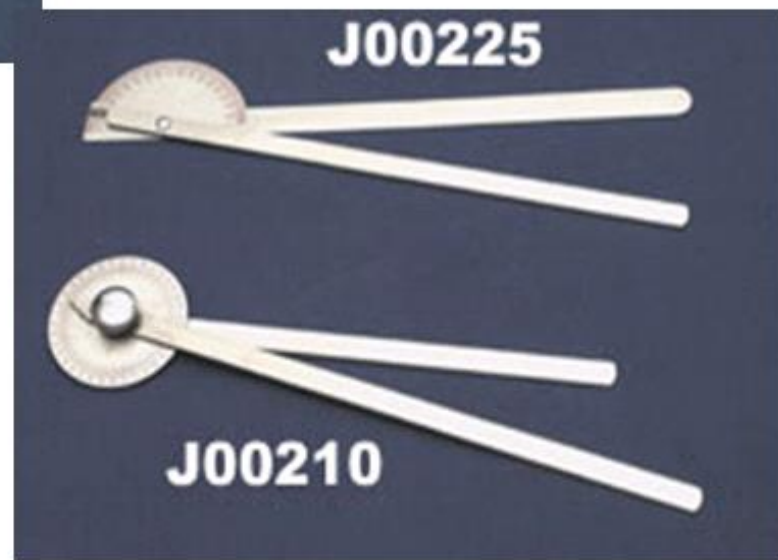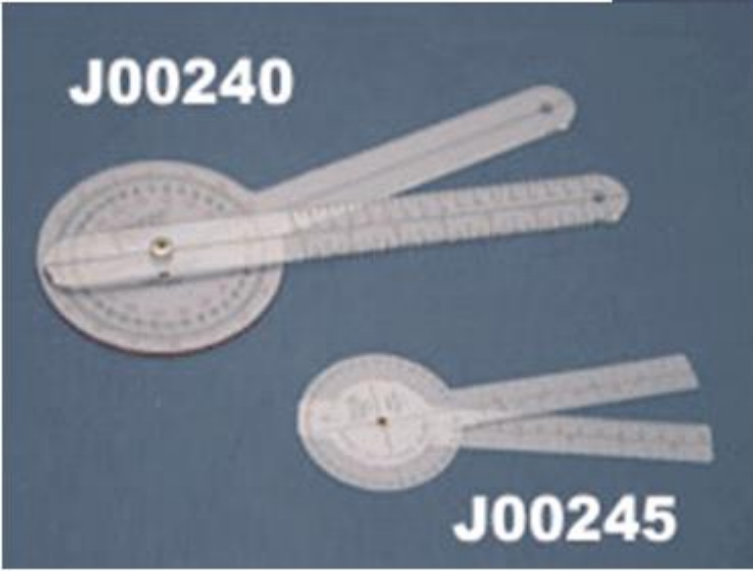
Hand and Upper Extremity Range of Motion

1. Measure active motion of the joints.

2. Use tables, figures, and pie charts for each joint to determine impairment of upper extremity.

3. Use of opposite, uninvolved joint as a baseline is optional.

Hand and Upper Extremity Range of Motion

4. **Add** impairments in **same** joint.

5. **Combine** impairments in **different** joints.

6. **Combine** different **types** of impairments.

Each ROM has its own picture of how to perform measurement

Figure 20. Neutral Position (top) and Flexion (bottom) of Finger PIP Joint.

0°

0°

40 °

100°
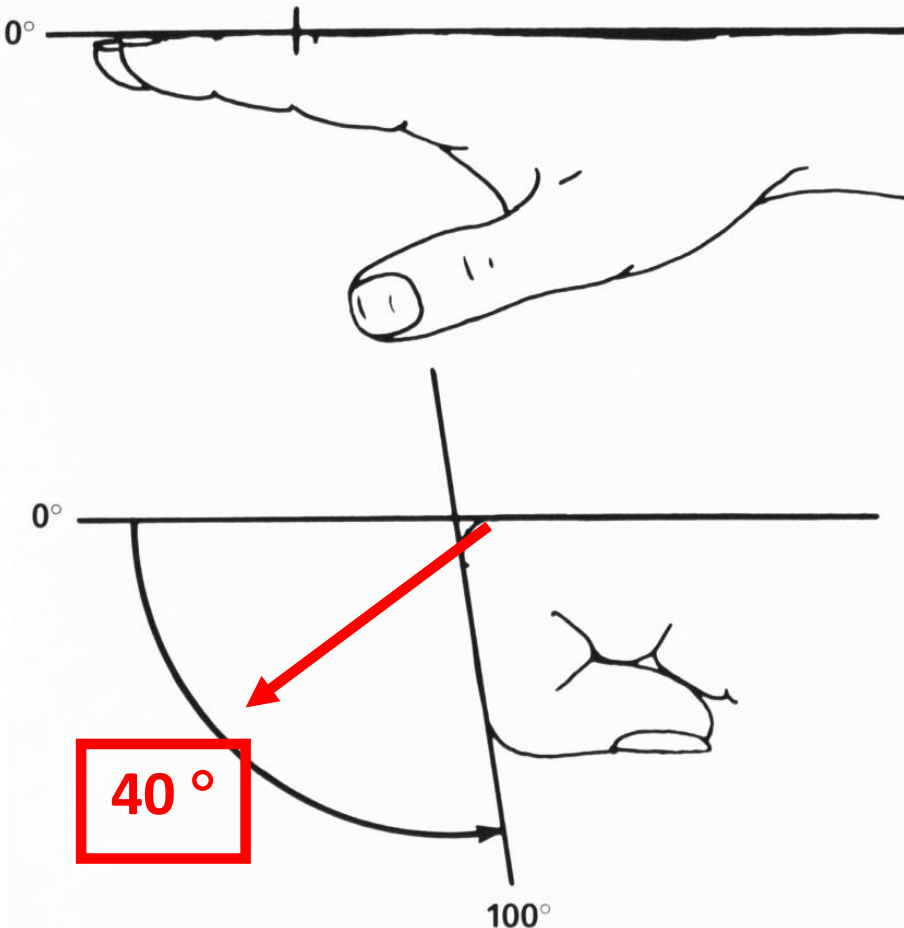
Figure 21. Finger Impairments Due to Abnormal Motion at PIP Joint. Relative value of functional unit is 80%.†

Finger PIP

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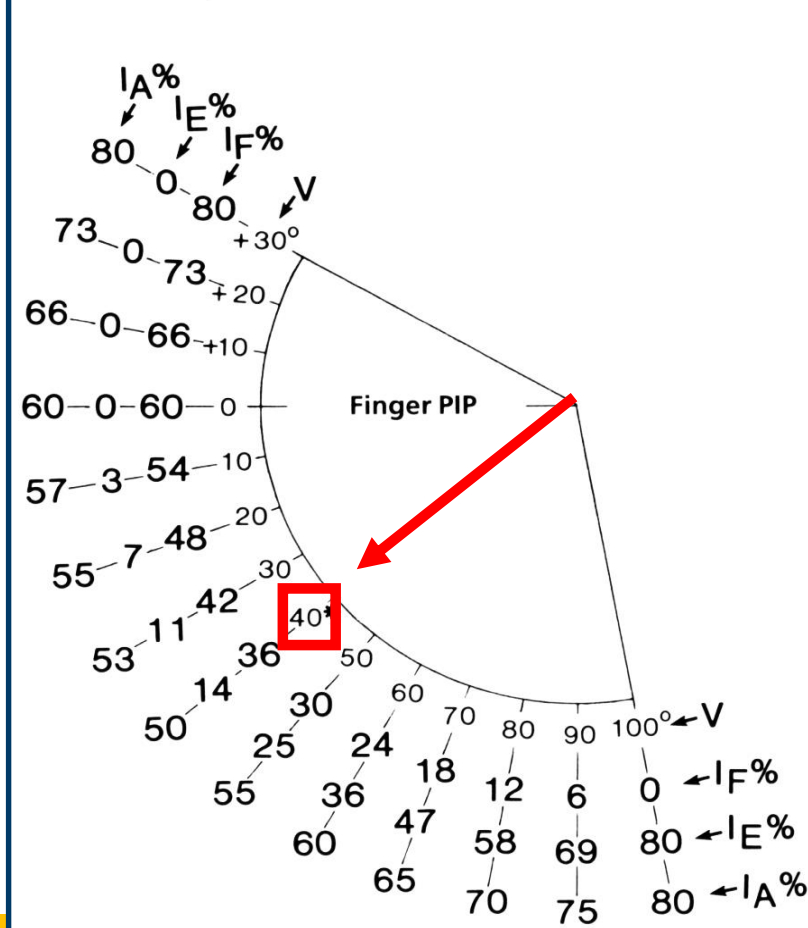
Reading Hand and Upper Extremity ROM Tables

Pie charts

- $I_A\%$ = impairment value for ankylosis

- $I_E\%$ = impairment value for extension

- $I_F\%$ = impairment value for flexion

- V = value measured

Reading Hand and Upper Extremity ROM Tables

Example:

- Index finger PIP has extension lag of **-20°** and **60°** of flexion

- Figure 21, p. 33 $I_E\%$ = 7% + $I_F\%$ = 24%

- 7% + 24% = 31% **index finger impairment**

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Reading Hand and UE ROM Tables

Figure 20. Neutral Position (top) and Flexion (bottom) of Finger PIP Joint.
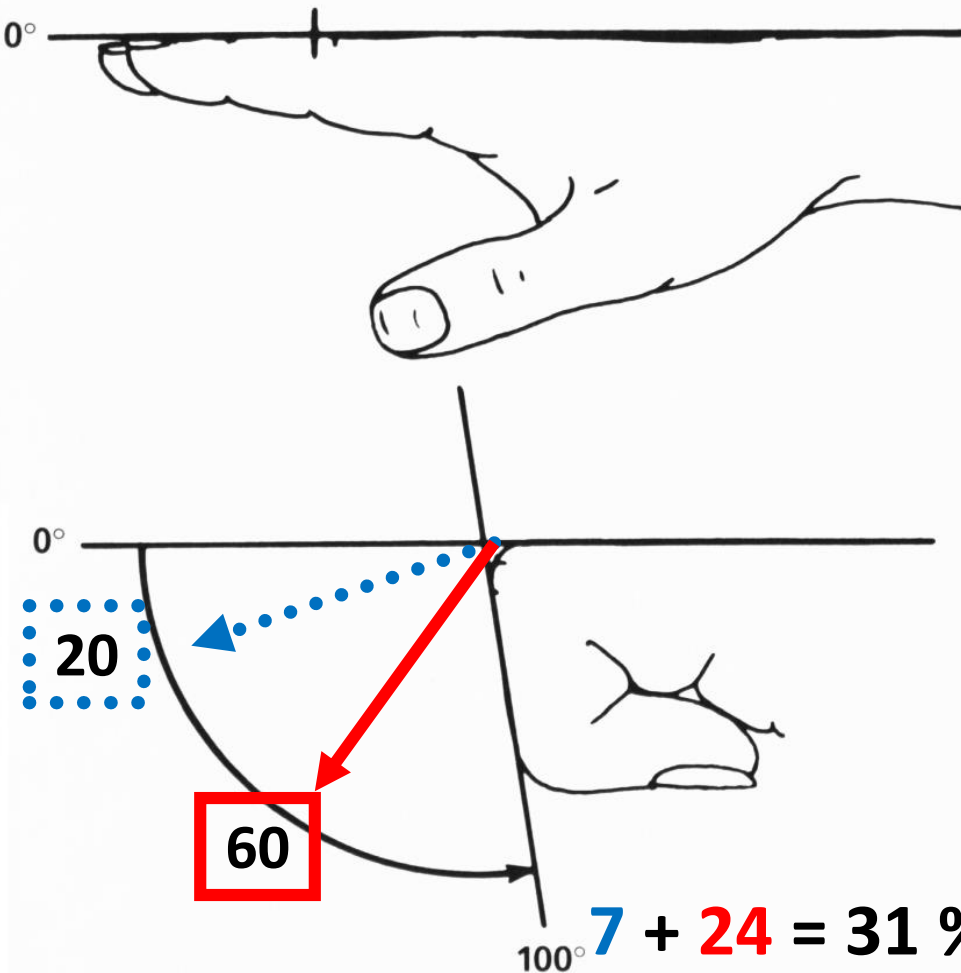
Figure 21. Finger Impairment Due to Abnormal Motion at PIP Joint. Release value of functional unit is 80%.

20

60

7 + 24 = 31 % DIGIT
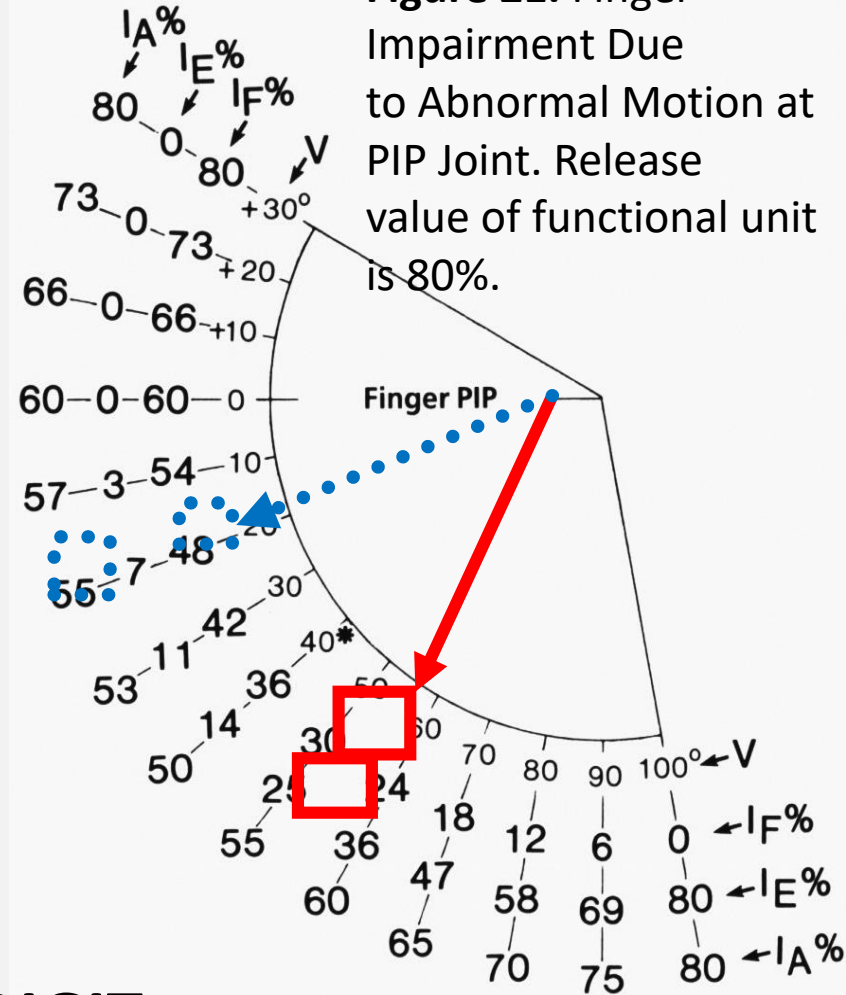
ROM Tables

- Fig. 1, p. 16 states: "Combine impairment % MP+PIP+DIP=."

- ROM impairment value for **more** than one finger **joint** should be **combined**.

- See description on P. 34, 2nd column at the top of the page above Fig. 23.

Abnormal Motion Thumb

FIVE AREAS OF MOTION
1. IP JOINT
2. MP JOINT
3. ADDUCTION
4. ABDUCTION
5. OPPOSITION

Goniometers

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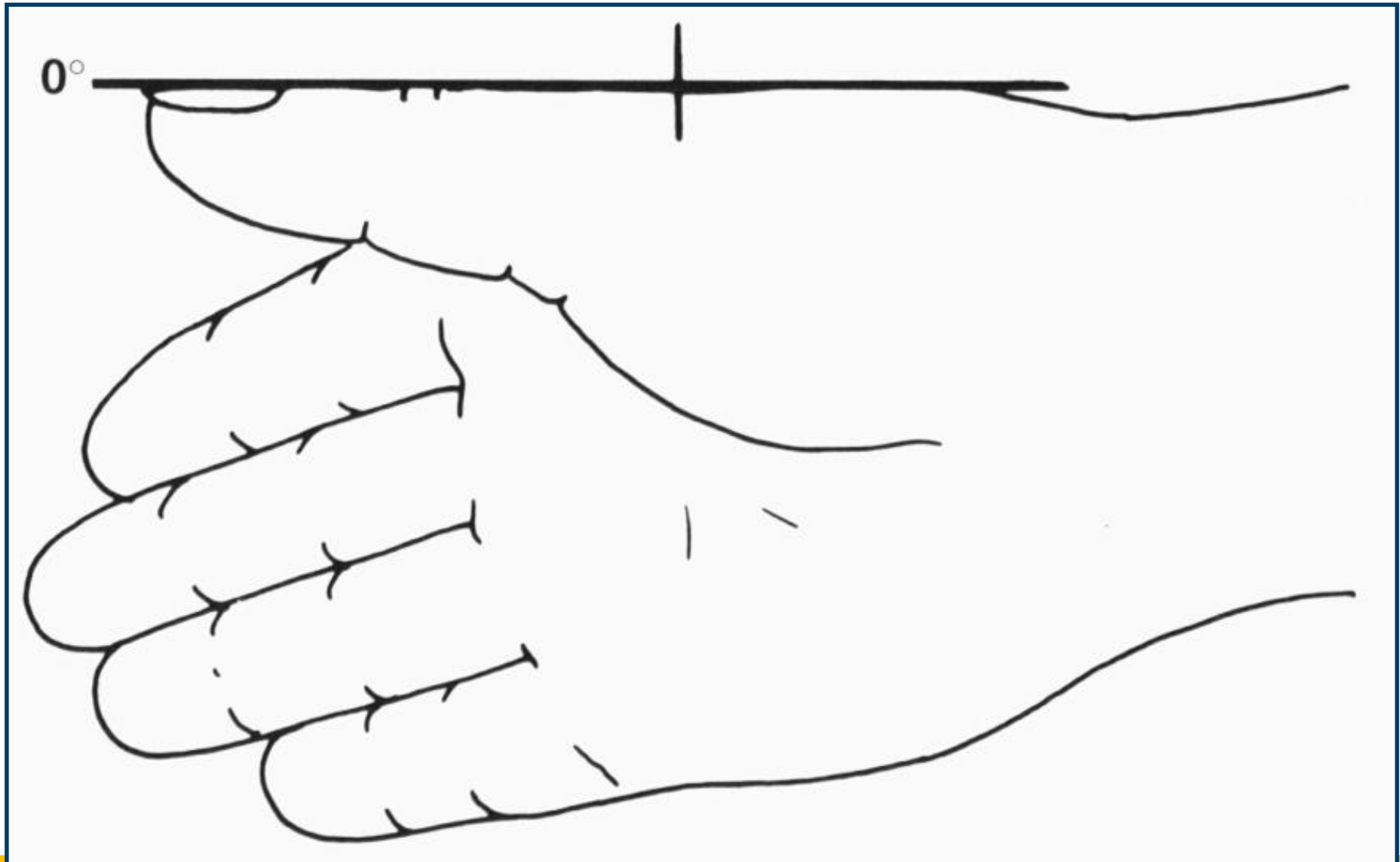
Figure 8, p. 25

Figure 8, p. 25
Flexion of Thumb IP Joint

0°

80°

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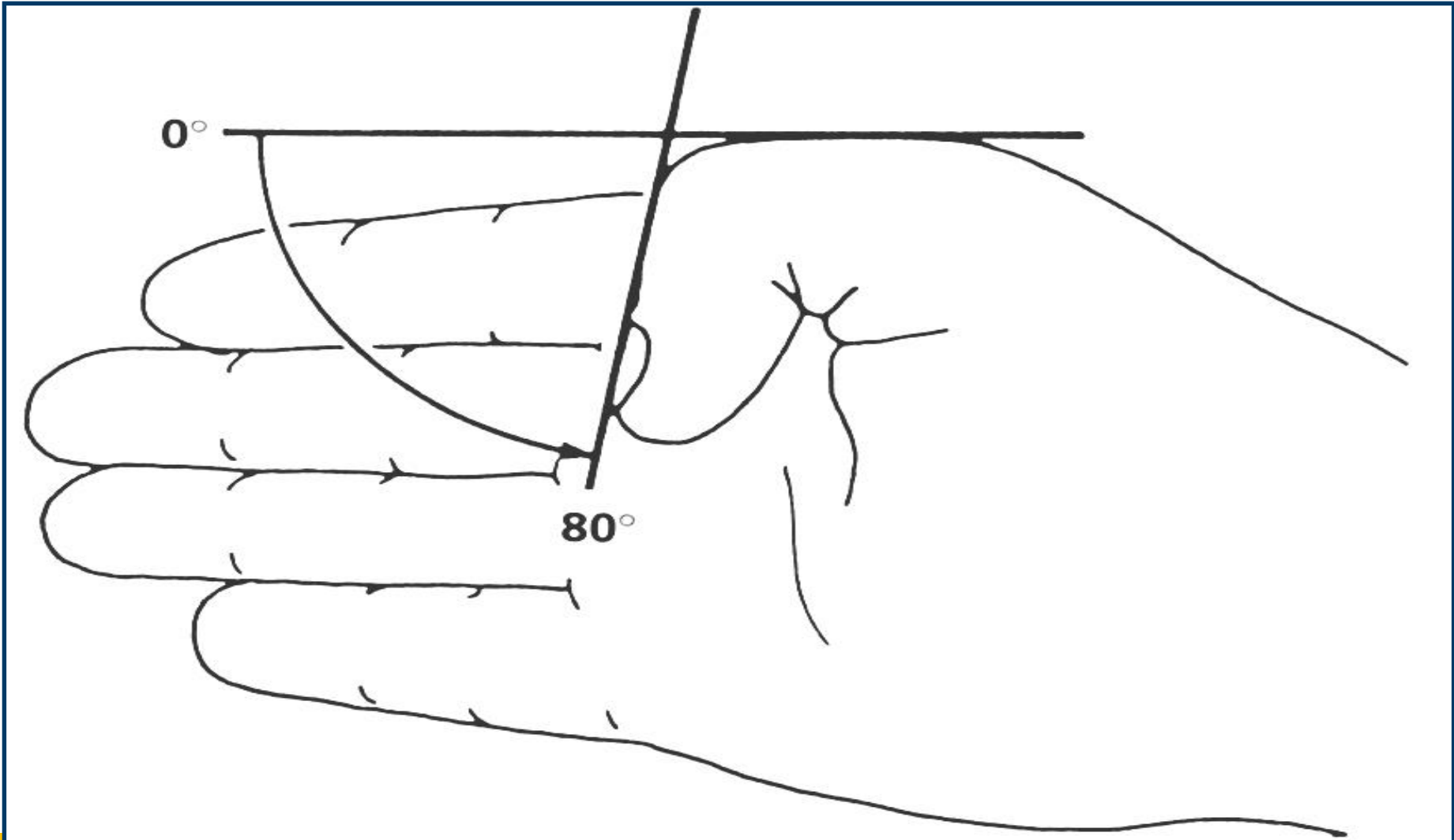
Figure 10, p. 26

Thumb Impairments Due to Abnormal Motion at the IP Joint Relative value of functional unit is 15% of total thumb motion.

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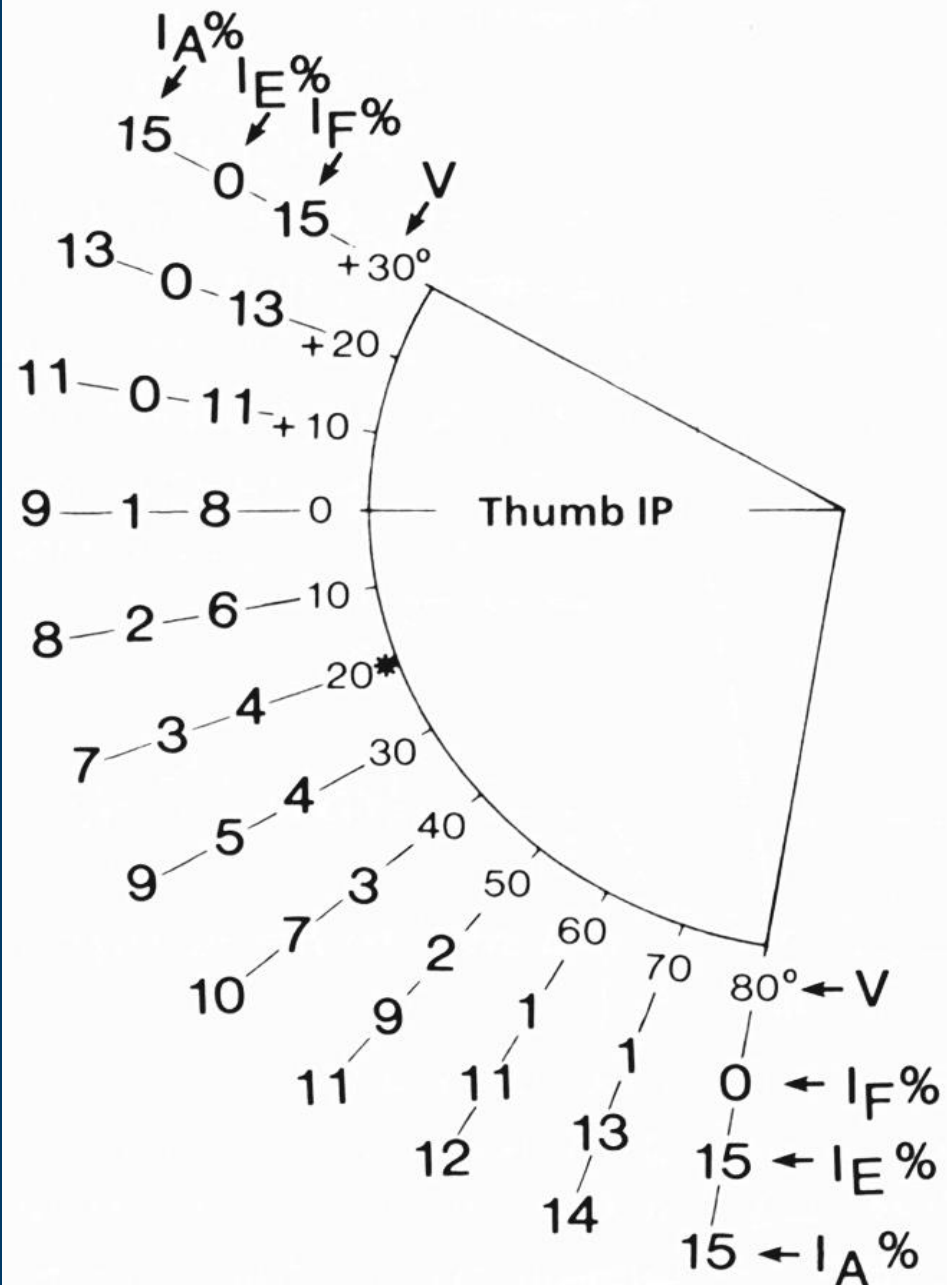
Thumb IP Joint: Flexion/Extension
Note: 0° Extension has impairment

- IP Joint Motion: Fig. 10 (p. 26)

0° Extension
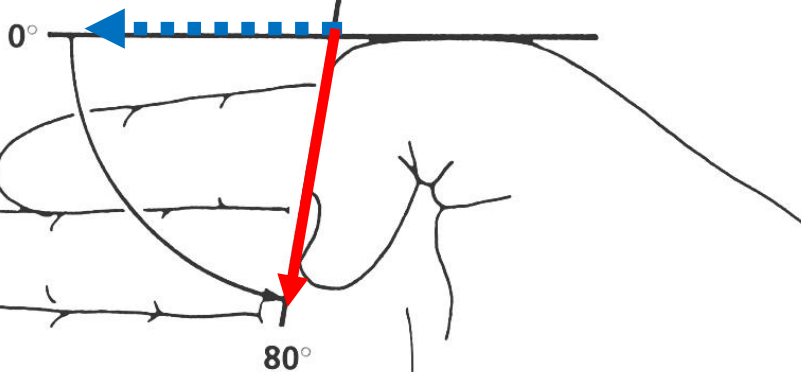
80° Flexion
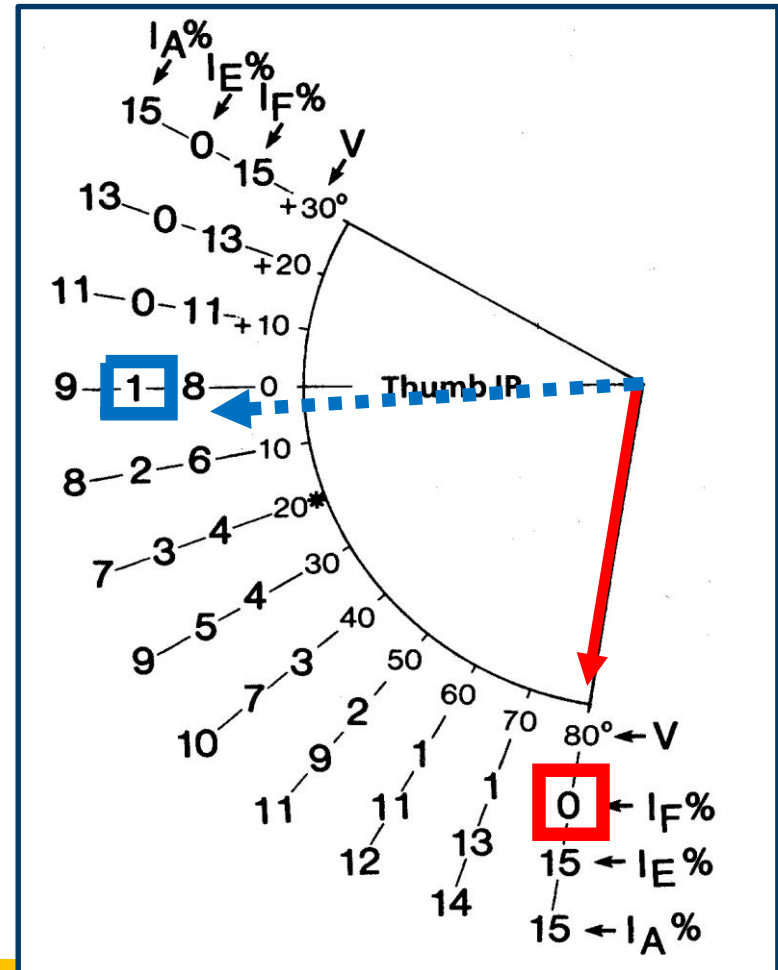
Thumb MP Joint: Flexion/Extension

- Fig. 11 (p. 27)

- Abnormal MP joint motion: Fig. 13 (p. 27)

0° Extension

60° Flexion
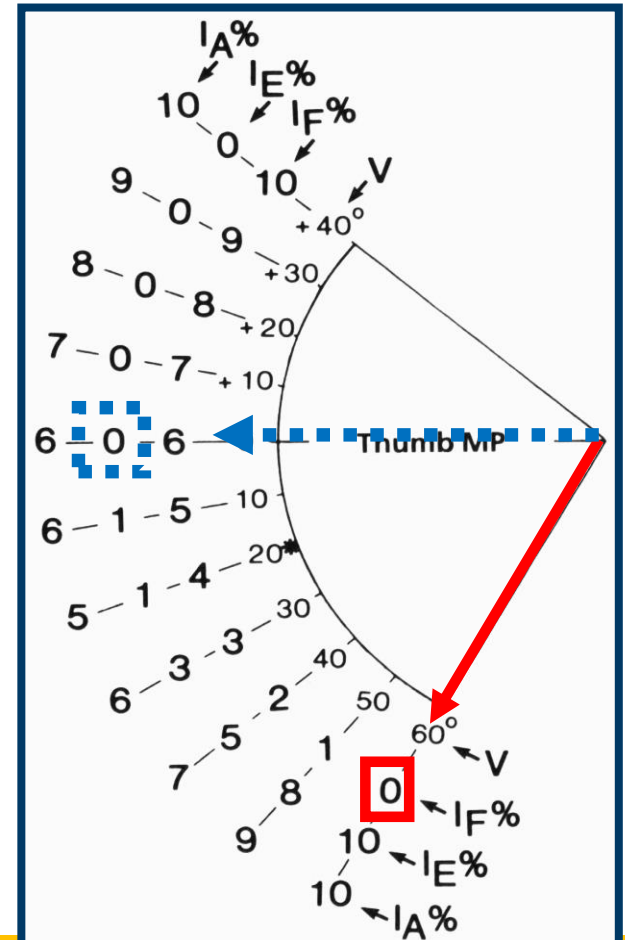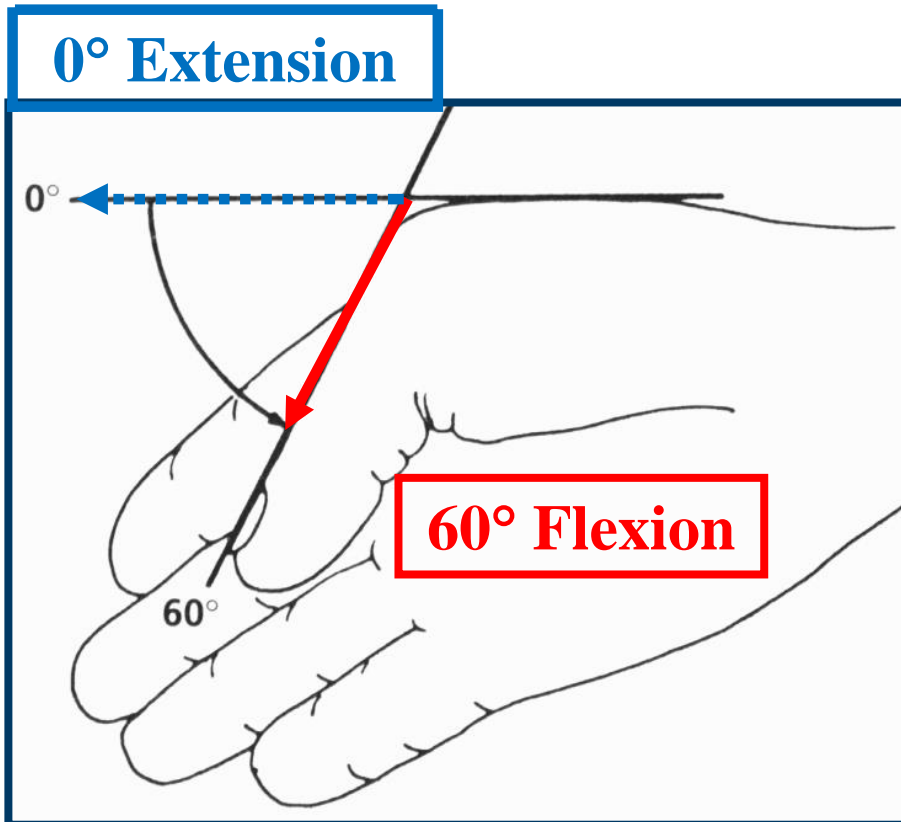
Radial Abduction

- Measure and record the *largest* possible angle in degrees formed by the first and second metacarpals

Measured radial abduction (°)	% Thumb impairment due to	
	Abnormal motion	Ankylosis
0	10	10
10	9	10
20	7	10
30	3	10
40	1	10
50	0	10

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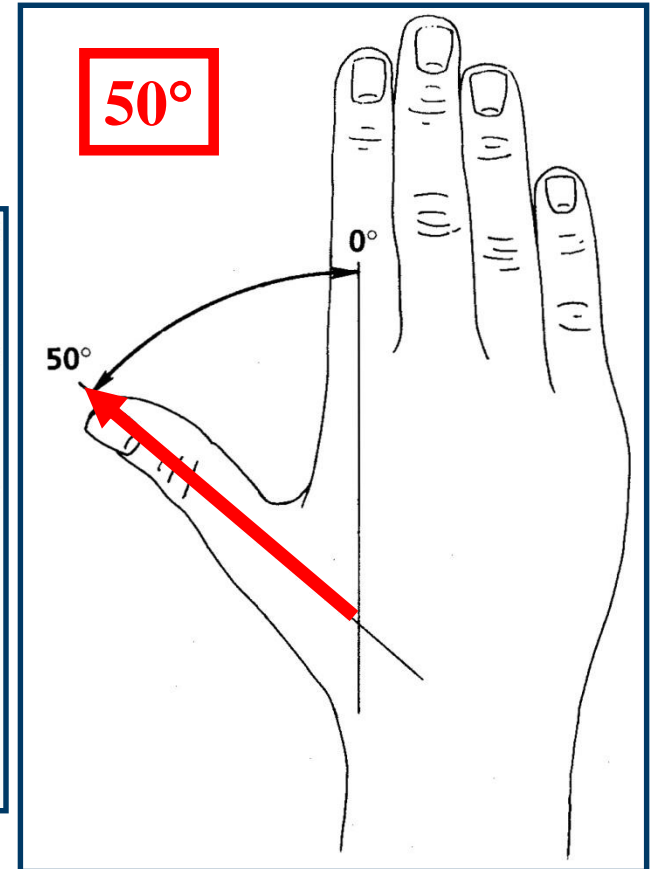
Adduction

- Measure and record the *smallest* possible distance in cm from the flexor crease of the thumb IP joint to the distal palmar crease over the MP joint of the little finger (normal = 0 cm)

- **Note: T. 5 lists "Measured lack of adduction (cm)" vs. measured adduction**

- Impairment Values: T. 5 (P, 28)

Measured lack of adduction (cm)	% Thumb impairment due to	
	Abnormal motion	Ankylosis
8	20	20
7	13	19
6	8	17
5	6	15
4	4	10
3	3	15
2	1	17
1	0	19
0	0	20

Opposition

- Measure and record the ***largest*** possible distance in cm from the flexor crease of the thumb IP joint to the distal palmar crease directly over the third MP joint: Fig. 15 (p. 29)

- Impairment Values: T. 7 (P. 29)

Measured opposition (cm)	% Thumb impairment due to	
	Abnormal motion	Ankylosis
0	45	45
1	31	40
2	22	36
3	13	31
4	9	27
5	5	22
6	3	24
7	1	27
8	0	29

Abnormal Motion Thumb

Five Areas of Motion

- **Add** Impairment Losses of **different** joints of Thumb

- Convert Using Tables 1, 2, & 3

- **Use Fig. 1**

Finger Range of Motion

- Each joint has its own pie chart to determine impairment value.

- Motion falling between values in pie charts is rounded to the nearest

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DIP, PIP, and MP Measurements
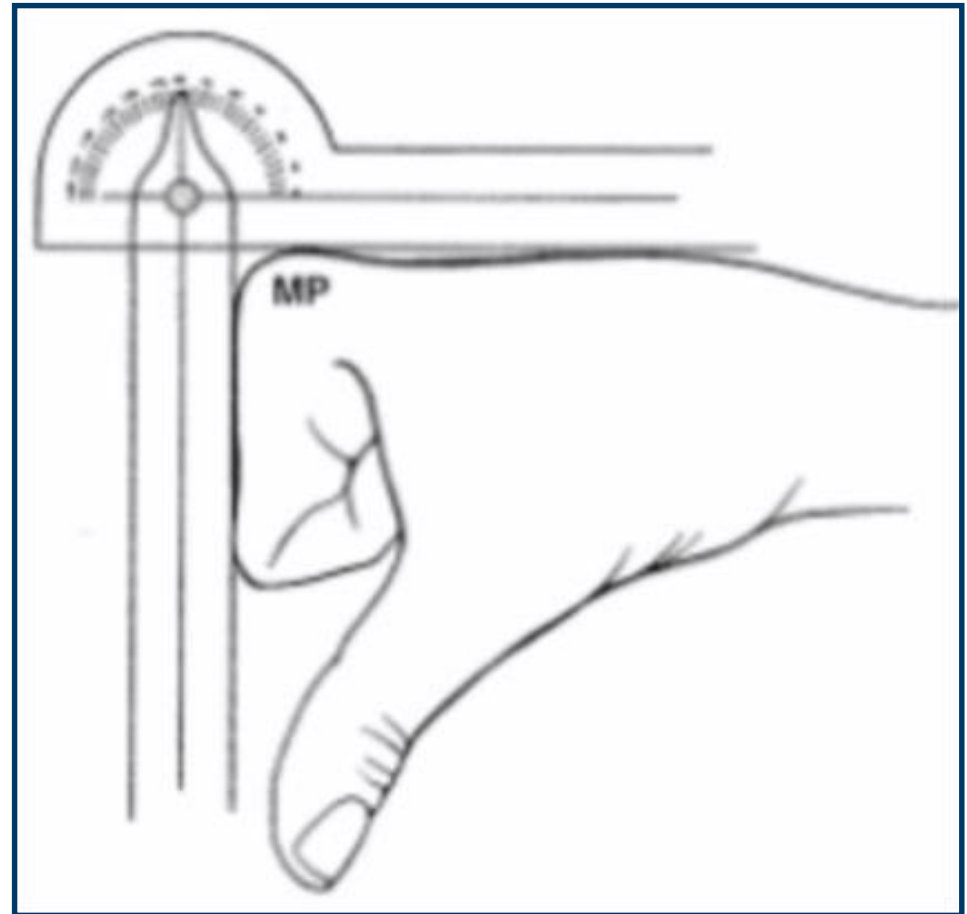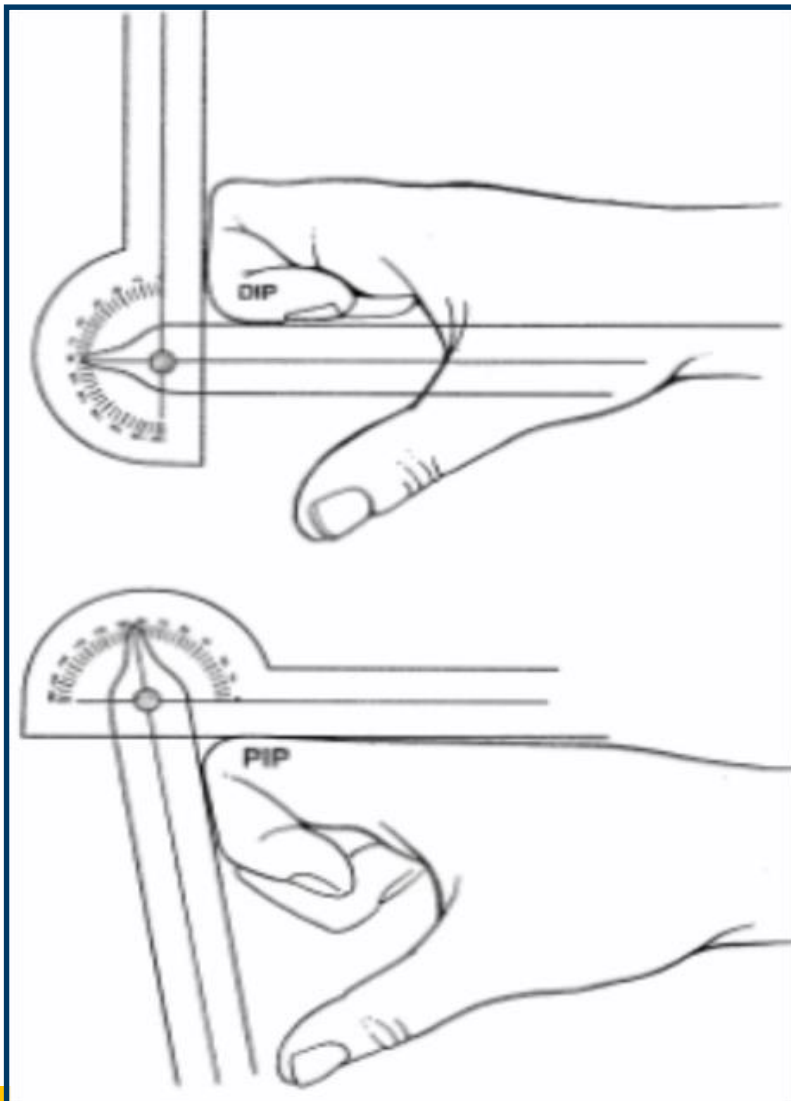
DIP Flexion-Extension

Fig. 18, p. 32
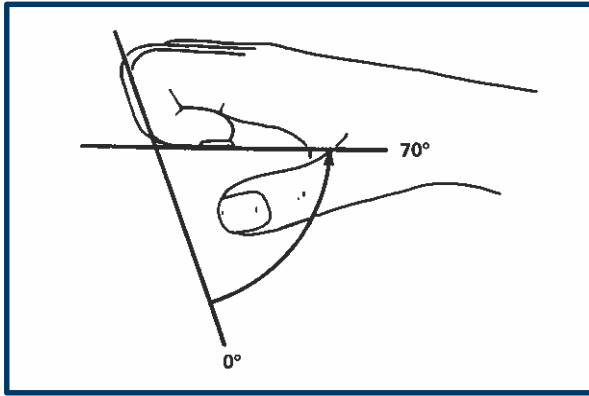
Fig. 19, p. 32
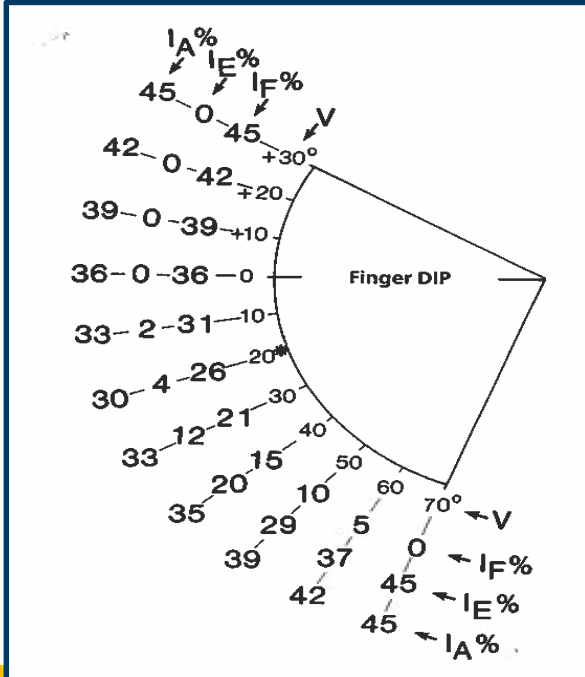
PIP Flexion-Extension

Fig. 20, p. 33
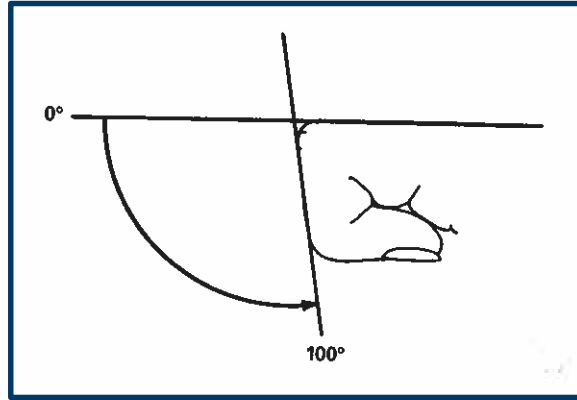
Fig. 21, p. 33
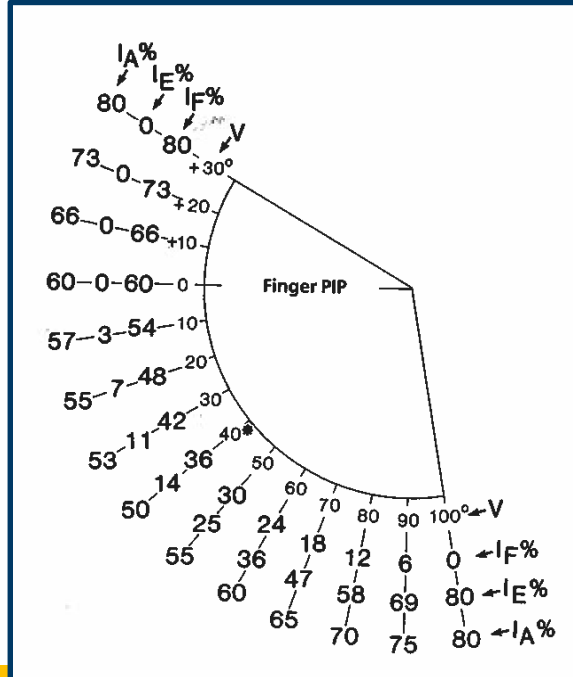
MP Flexion-Extension

Fig. 22, p. 34
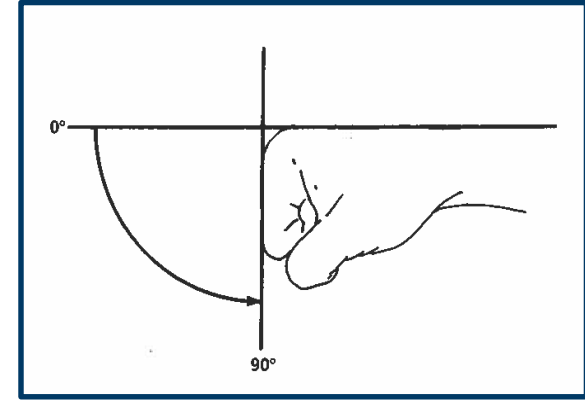
Fig. 23, p. 34
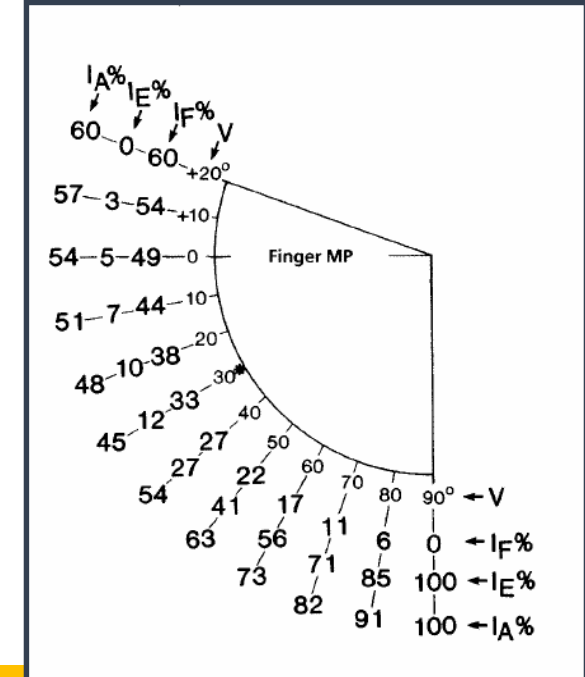
Finger Range of Motion

- **Add** impairments in **same** joint

- **Combine** impairments in **different** joints

Finger Range of Motion

- Obtain total digit impairment

- Convert to whole person using Tables 1, 2, & 3

- **Use Fig. 1**

What do you do with multiple *types* of impairments (range of motion, sensory, etc.)?

- Determine impairment from each *type* of impairment (sensory, range of motion, etc.)

- **Combine** the different **types** to arrive at a *total impairment* for that *digit*.

- Convert using Tables 1, 2, and 3

- **Use Figure 1**

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What if more than one digit has an impairment?

1. Determine the impairment of ***each individual digit.***

2. Convert each digit impairment to a **hand** impairment using T. 1.

What if more than one digit has an impairment?

1. *Add* the **hand** impairments for each digit for a *total hand impairment*

2. Convert hand to UE using Table 2

3. Convert UE to whole person using Table 3

(NOTE: if more than one UE impairment is involved, *combine* before converting)

No deduction for non-preferred extremity

Figure 1

- Upper Extremity Impairment Evaluation Record

Figure 1. Upper Extremity Impairment Evaluation Record**—Part 1 (Hand)

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand) Side ☐ R ☐ L

Name_____ Age_____ Sex ☐ M ☐ F Dominant hand ☐ R ☐ L Date_____

Occupation_____ Diagnosis_____

			Abnormal motion				Amputation	Sensory loss	Other disorders	Hand impairment%
			Record motion, ankylosis, and impairment %				Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%
			Flexion	Extension	Ankylosis	IMP%				
Thumb	IP	Angle°								
		IMP%								
	MP	Angle°								
		IMP%								
			Motion	Ankylosis	IMP%					
	CMC	Radial abduction	Angle°							Abnormal motion [1]
			IMP%							Amputation [2]
		Adduction	CMS							Sensory loss [3]
			IMP%							Other disorders [4]
		Opposition	CMS							Digit impairment % • Combine 1, 2, 3, 4
			IMP%							
	Add impairment % CMC + MP + IP =					[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	**Hand impairment % *Convert above**
			Flexion	Extension	Ankylosis	IMP%				
Index	DIP	Angle°								Abnormal motion [1]
		IMP%								Amputation [2]
	PIP	Angle°								Sensory loss [3]
		IMP%								Other disorders [4]
	MP	Angle°								Digit impairment % • Combine 1, 2, 3, 4
		IMP%								
	• Combine impairment % MP + PIP + DIP =					[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	**Hand impairment % *Convert above**
		Angle°								Abnormal motion [1]

							IMP % =	IMP % =	IMP % =	*Convert above	
		• Combine impairment %	MP + PIP + DIP =								

Ring											
	DIP	Angle°								Abnormal motion [1]	
		IMP%								Amputation [2]	
	PIP	Angle°								Sensory loss [3]	
		IMP%								Other disorders [4]	
	MP	Angle°								Digit impairment % • Combine 1, 2, 3, 4	
		IMP%									

				[1]	[2]	[3]	[4]	Hand impairment %
• Combine impairment %	MP + PIP + DIP =		IMP % =	IMP % =	IMP % =			*Convert above

Little											
	DIP	Angle°								Abnormal motion [1]	
		IMP%								Amputation [2]	
	PIP	Angle°								Sensory loss [3]	
		IMP%								Other disorders [4]	
	MP	Angle°								Digit impairment % • Combine 1, 2, 3, 4	
		IMP%									

			[1]	[2]	[3]	[4]	Hand impairment %
• Combine impairment %	MP + PIP + DIP =		IMP % =	IMP % =	IMP % =		*Convert above

Total hand impairment (Add hand impairment % for thumb + index + middle + ring + little finger) =	%
Upper extremity impairment (†Convert total hand impairment % to upper extremity impairment %) =	%; enter on Part 2 , Line II
If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment:‡ =	%

• Combined Values Chart; (p. 322-324)   *Use Table 1 (Digits to hand p. 18);   †Use Table 2 (Hand to upper extremity p. 19)   ‡Use Table 3 (p. 20)

** Courtesy of G. de Groot Swanson, MD

Upper Extremity Case 4 MMI/IR

History of Injury

- 25 year old male one year ago developed pain over the dorsal hand overlying the first metacarpal.

- He was diagnosed with DeQuervain's tenosynovitis of the right thumb secondary to repetitive injury.

- Occupation is dental technician.

Upper Extremity Case 4 MMI/IR

Treatment History

- He has had 12 PT sessions and 2 steroid injections followed by abductor pollicis longus tendon sheath released 6 months ago.

- This was followed by 16 PT sessions post surgery.

- He was released by his surgeon to return to work 3 months ago without restrictions.

- He is now being followed by a family physician who is recommending additional PT and work conditioning.

Upper Extremity Case 4 MMI/IR

The insurance carrier adjustor requested a designated doctor examination for MMI and IR. The accepted/compensable injuries/conditions are:

"DeQuervain's Tenosynovitis of the right thumb."

Upper Extremity Case 4 MMI/IR

Designated Doctor Medical History

- He complains of occasional thumb discomfort but indicates some relief with OTC NSAIDS as needed for pain.

- He is working without restrictions.

- He has no other complaints but reported his family physician is suggesting additional PT and WC.

Upper Extremity Case 4 MMI/IR

Designated Doctor Physical Examination

- Your examination shows a well healed scar consistent

  with his surgery.

- There is mild tenderness over the scar.

- Sensory is normal. Neurovascular

Upper Extremity Case 4 MMI/IR

Designated Doctor Physical Examination

Right thumb exam

- IP flexion 70$°$, extension 10$°$
- MP flexion 50$°$, MP extension 0$°$
- Abduction 70$°$
- Lack of adduction = 1cm (Adduction is carried to between ring and little finger MIP joints, 7cm)
- Able to oppose to 7cm from the palm
- 5/5 strength

MMI/IR - Upper Extremity Case 4

Designated Doctor Physical Examination

- Based on the medical records and your physical examination of the injured employee, what is the compensable injury for certifying MMI and IR?

MMI/IR – Upper Extremity Case 4

Question for the Designated Doctor:

On the MMI date, what is the whole person IR?

Show your work!

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MMI/IR – Upper Extremity Case 4

Question for designated doctor:

On the certified MMI date, what is the whole person impairment rating?

Show Your Work!

5. On the Date of MMI, what is the whole person IR?

A. 10%

B. 8%

C. 3%

D. 1%

Figure 10, p. 26

IP flexion 70° = 1%

IP extension 10° = 0%

Add 1% + 0% = 1%

(IP thumb impairment)
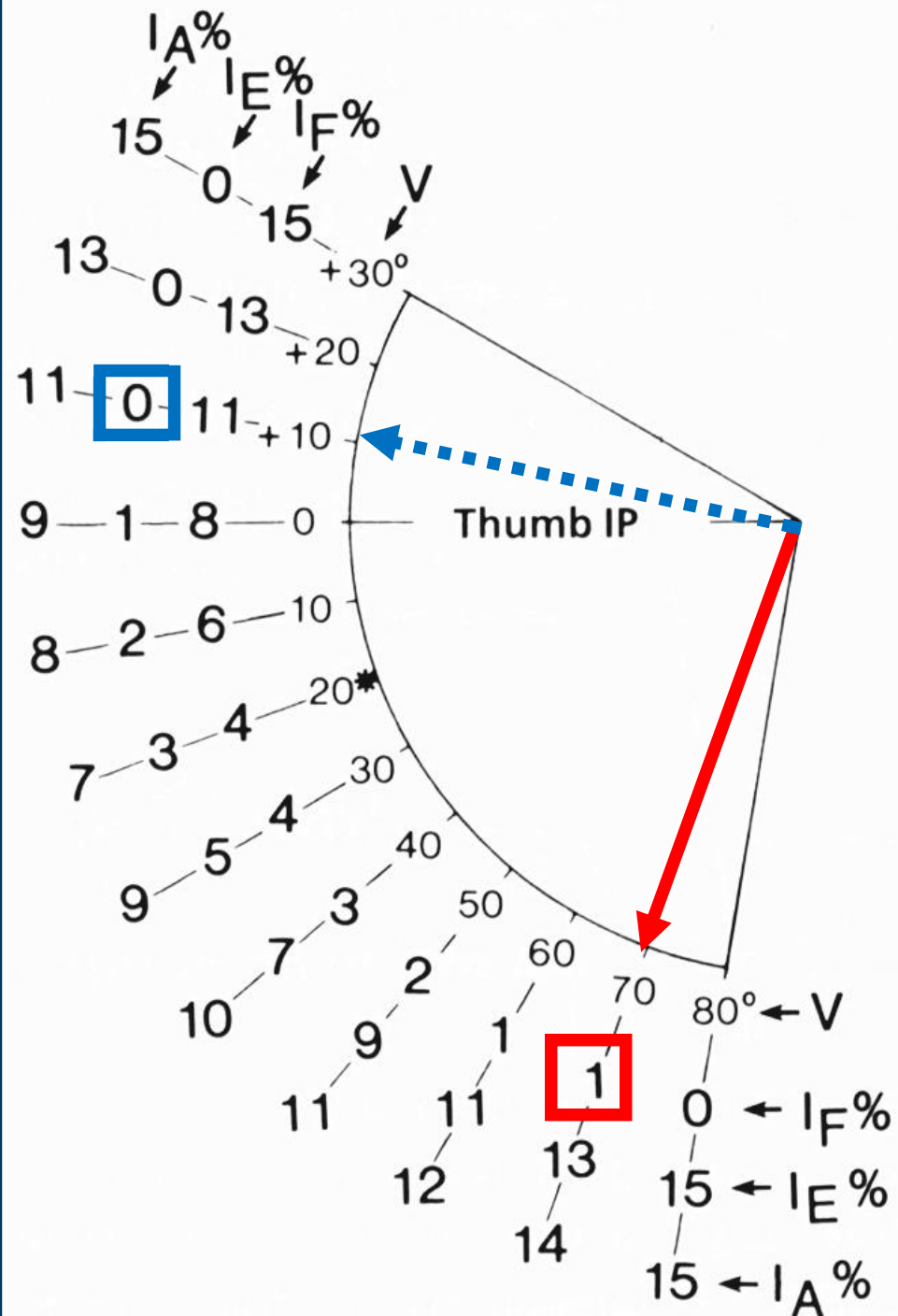
Figure 13, p. 27

MP flexion 50^0 = 1%

MP extension 0^0 = 0%

Add 0% + 1% = 1%

(MP thumb impairment)
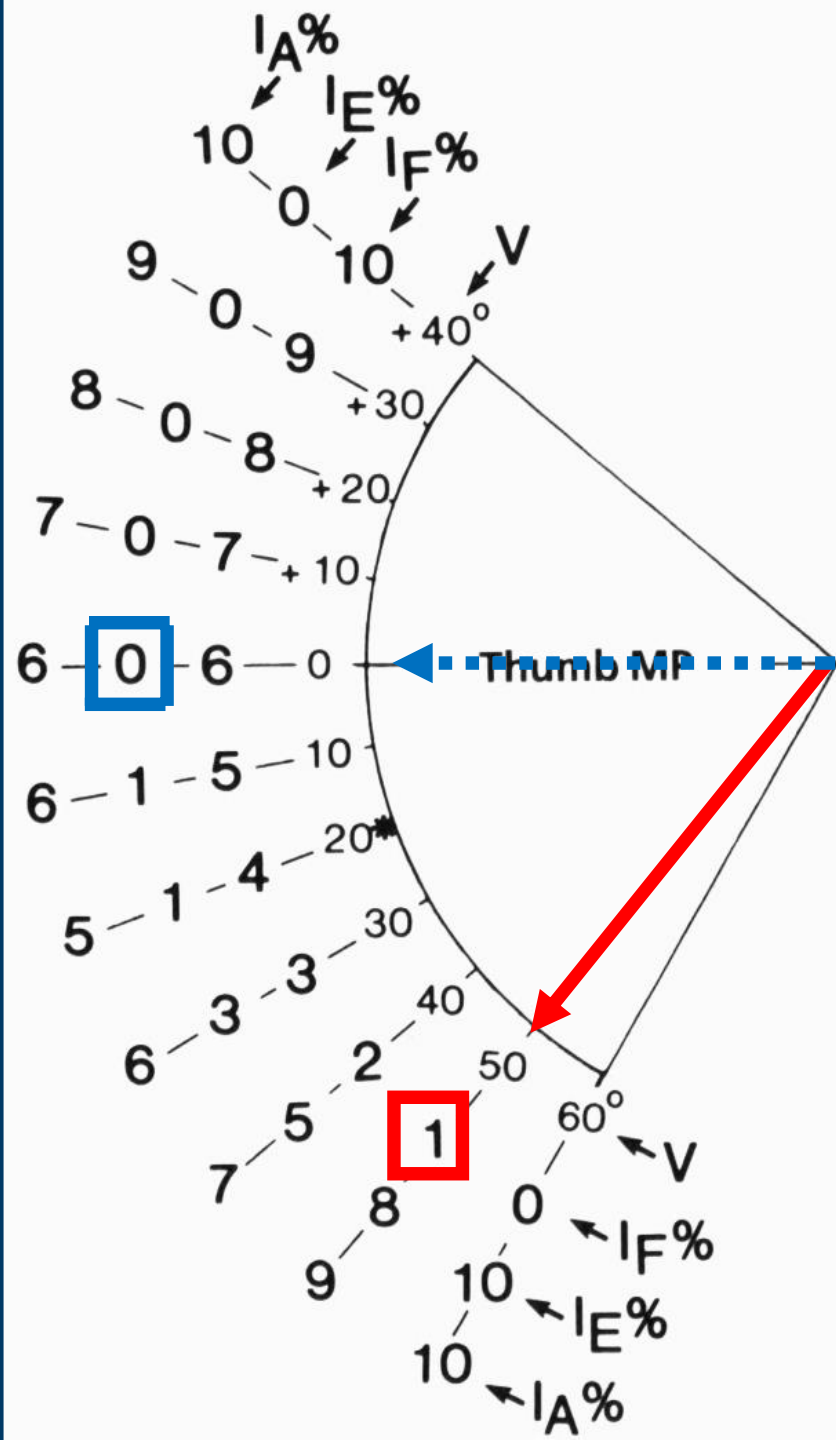
T. 6, P. 28	% Thumb impairment due to	
Measured radial abduction (°)	Abnormal motion	Ankylosis
0	10	10
10	9	10
20	7	10
30	3	10
40	1	10
50	0	10

Abduction 70° = 0% thumb impairment

Figure 14, p. 28

Measure lack of adduction

Note: lack of 8 cm of adduction = 100% impairment
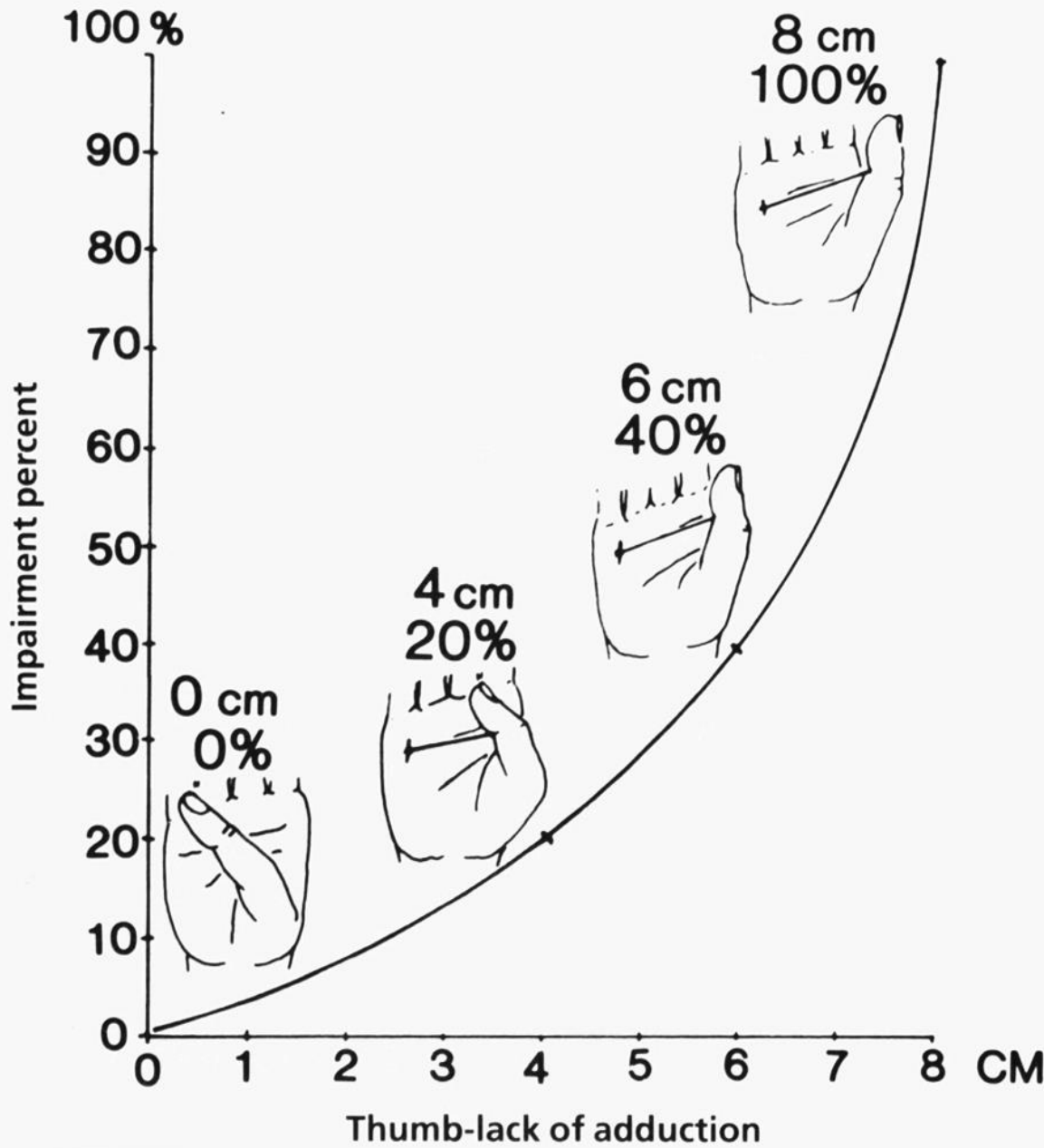
1 cm measured lack of adduction
(Adduction to between ring and little finger MP joints, 7 cm) = 0% thumb impairment

T. 5,
P. 28

Measured lack of adduction (cm)	% Thumb impairment due to	
	Abnormal motion	Ankylosis
8	20	20
7	13	19
6	8	17
5	6	15
4	4	10
3	3	15
2	1	17
1	0	19
0	0	20

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Able to oppose to 7cm from the palm = 1% thumb impairment

T. 7, P. 29

Measured opposition (cm)	% Thumb impairment due to	
	Abnormal motion	Ankylosis
0	45	45
1	31	40
2	22	36
3	13	31
4	9	27
5	5	22
6	3	24
7	1	27
8	0	29

Abnormal Motion Thumb

Five Areas of Motion

- **Add** Impairment Losses of *different* joints of Thumb

- Convert Using Tables 1, 2, and 3

- **Use Fig. 1**

Thumb ROM Impairment

- IP flexion (70°) 1% + IP extension (10°) 0% = 1%

- MP flexion (50°) 1% + IP extension (0°) 0%   = 1%

- Abduction 70° = 0%

- Adduction lacks 1 cm = 0%

- Opposition to 7cm from the palm = 1%

TOTAL 1% + 1% + 1% = **3% thumb impairment**

Using T. 1, P. 18, Convert Digit to Hand

- **3% Thumb Impairment**
- **= 1% Hand**

Table 1. Relationship of Impairment of the Digits to Impairment of the Hand.*

% Impairment of			% Impairment of			% Impairment of		
Thumb		**Hand**	**Index or middle finger**		**Hand**	**Ring or little finger**		**Hand**
0 -	1	0	0 -	2	0	0 -	4	0
2 -	3	1	3 -	7	1	5 -	14	1
4 -	6	2	8 -	12	2	15 -	24	2
7 -	8	3	13 -	17	3	25 -	34	3
9 -	11	4	18 -	22	4	35 -	44	4
12 -	13	5	23 -	27	5	45 -	54	5
14 -	16	6	28 -	32	6	55 -	64	6
17 -	18	7	33 -	37	7	65 -	74	7
19 -	21	8	38 -	42	8	75 -	84	8
22 -	23	9	43 -	47	9	85 -	94	9
24 -	26	10	48 -	52	10	95 - 100		10
27 -	28	11	53 -	57	11			
29 -	31	12	58 -	62	12			
32 -	33	13	63 -	67	13			
34 -	36	14	68 -	72	14			
37 -	38	15	73 -	77	15			
39 -	41	16	78 -	82	16			
42 -	43	17	83 -	87	17			
44 -	46	18	88 -	92	18			
47 -	48	19	93 -	97	19			
49 -	51	20	98 - 100		20			
52 -	53	21						
54 -	56	22						
57 -	58	23						
59 -	61	24						
62 -	63	25						
64 -	66	26						
67 -	68	27						
69 -	71	28						
72 -	73	29						
74 -	76	30						
77 -	78	31						
79 -	81	32						
82 -	83	33						
84 -	86	34						
87 -	88	35						
89 -	91	36						
92 -	93	37						
94 -	96	38						
97 -	98	39						
99 - 100		40						

*See Table 2 (p. 19) for converting hand impairment to upper extremity impairment.

Using Table 2: Convert 1% Hand = *1% Upper Extremity*

Table 2. Relationship of Impairment of the Hand to Impairment of the Upper Extremity.*

% Impairment of Hand	Upper extremity	% Impairment of Hand	Upper extremity	% Impairment of Hand	Upper extremity	% Impairment of Hand	Upper extremity	% Impairment of Hand	Upper extremity	% Impairment of Hand	Upper extremity
0 =	0	18 =	16	35 =	32	53 =	48	70 =	63	88 =	79
1 =	1	19 =	17	36 =	32	54 =	49	71 =	64	89 =	80
2 =	2			37 =	33			72 =	65		
3 =	3	20 =	18	38 =	34	55 =	50	73 =	66	90 =	81
4 =	4	21 =	19	39 =	35	56 =	50	74 =	67	91 =	82
		22 =	20			57 =	51			92 =	83
5 =	5	23 =	21	40 =	36	58 =	52	75 =	68	93 =	84
6 =	5	24 =	22	41 =	37	59 =	53	76 =	68	94 =	85
7 =	6			42 =	38			77 =	69		
8 =	7	25 =	23	43 =	39	60 =	54	78 =	70	95 =	86
9 =	8	26 =	23	44 =	40	61 =	55	79 =	71	96 =	86
		27 =	24	45 =	41	62 =	56			97 =	87
10 =	9	28 =	25	46 =	41	63 =	57	80 =	72	98 =	88
11 =	10	29 =	26	47 =	42	64 =	58	81 =	73	99 =	89
12 =	11			48 =	43			82 =	74		
13 =	12			49 =	44	65 =	59	83 =	75	100 =	90
14 =	13	30 =	27			66 =	59	84 =	76		
		31 =	28	50 =	45	67 =	60	85 =	77		
15 =	14	32 =	29	51 =	46	68 =	61	86 =	77		
16 =	14	33 =	30	52 =	47	69 =	62	87 =	78		
17 =	15	34 =	31								

*Consult Table 3 (p. 20) to convert upper extremity impairment to whole-person impairment.

Using Table 3, p. 20 Convert

- **1% Upper Extremity =**
- **1% Whole Person**

Table 3. Relationship of Impairment of the Upper Extremity to Impairment of the Whole Person.

% impairment of			% impairment of			% impairment of		
Upper extremity		Whole person	Upper extremity		Whole person	Upper extremity		Whole person
0	=	0	35	=	21	70	=	42
1	=	1	36	=	22	71	=	43
2	=	1	37	=	22	72	=	43
3	=	2	38	=	23	73	=	44
4	=	2	39	=	23	74	=	44
5	=	3	40	=	24	75	=	45
6	=	4	41	=	25	76	=	46
7	=	4	42	=	25	77	=	46
8	=	5	43	=	26	78	=	47
9	=	5	44	=	26	79	=	47
10	=	6	45	=	27	80	=	48
11	=	7	46	=	28	81	=	49
12	=	7	47	=	28	82	=	49
13	=	8	48	=	29	83	=	50
14	=	8	49	=	29	84	=	50
15	=	9	50	=	30	85	=	51
16	=	10	51	=	31	86	=	52
17	=	10	52	=	31	87	=	52
18	=	11	53	=	32	88	=	53
19	=	11	54	=	32	89	=	53
20	=	12	55	=	33	90	=	54
21	=	13	56	=	34	91	=	55
22	=	13	57	=	34	92	=	55
23	=	14	58	=	35	93	=	56
24	=	14	59	=	35	94	=	56
25	=	15	60	=	36	95	=	57
26	=	16	61	=	37	96	=	58
27	=	16	62	=	37	97	=	58
28	=	17	63	=	38	98	=	59
29	=	17	64	=	38	99	=	59
30	=	18	65	=	39	100	=	60
31	=	19	66	=	40			
32	=	19	67	=	40			
33	=	20	68	=	41			
34	=	20	69	=	41			

Figure 1, p. 16

Figure 1. Upper Extremity Impairment Evaluation Record**—Part 1 (Hand)   Side ☐ R ☐ L

Name _BARRY BOCA_   Age _24_   Sex ☒M ☐F   Dominant hand ☒R ☐L   Date _XX/XX/XXXX_

Occupation _DENTAL TECHNICIAN_   Diagnosis _DEQUERVAIN'S TENOSYNOVITIS_
S/P SURGICAL RELEASE

			Abnormal motion				Amputation	Sensory loss	Other disorders	Hand Impairment%	
			Record motion, ankylosis, and impairment %				Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% • Convert to hand IMP%	
			Flexion	Extension	Ankylosis	IMP%					
Thumb	IP	Angle*	90	10		1%					
		IMP%	1%	0%							
	MP	Angle*	50	0		1%					
		IMP%	1%	0%							
			Motion	Ankylosis	IMP%						
	CMC	Radial abduction	Angle*	70		0%				Abnormal motion [1]	3%
			IMP%	0%						Amputation [2]	0
		Adduction	CMS	1 cm (lack of)		0%				Sensory loss [3]	0
			IMP%	0%						Other disorders [4]	0
		Opposition	CMS	7 cm		1%				Digit impairment % • Combine 1, 2, 3, 4	3%
			IMP%	1%							
	Add impairment % CMC + MP + IP =		3%		[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	Hand impairment % ^Convert above	1%

			Flexion	Extension	Ankylosis	IMP%					
Index	DIP	Angle*								Abnormal motion [1]	
		IMP%								Amputation [2]	
	PIP	Angle*								Sensory loss [3]	
		IMP%								Other disorders [4]	
	MP	Angle*								Digit impairment % • Combine 1, 2, 3, 4	
		IMP%									
	• Combine impairment % MP + PIP + DIP =				[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	Hand impairment % *Convert above	

Middle	DIP	Angle*								Abnormal motion [1]	
		IMP%								Amputation [2]	
	PIP	Angle*								Sensory loss [3]	
		IMP%								Other disorders [4]	
	MP	Angle*								Digit impairment % • Combine 1, 2, 3, 4	
		IMP%									
	• Combine impairment % MP + PIP + DIP =				[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	Hand impairment % *Convert above	

Ring	DIP	Angle*								Abnormal motion [1]	
		IMP%								Amputation [2]	
	PIP	Angle*								Sensory loss [3]	
		IMP%								Other disorders [4]	
	MP	Angle*								Digit impairment % • Combine 1, 2, 3, 4	
		IMP%									
	• Combine impairment % MP + PIP + DIP =				[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	Hand impairment % *Convert above	

Little	DIP	Angle*								Abnormal motion [1]	
		IMP%								Amputation [2]	
	PIP	Angle*								Sensory loss [3]	
		IMP%								Other disorders [4]	
	MP	Angle*								Digit impairment % • Combine 1, 2, 3, 4	
		IMP%									
	• Combine impairment % MP + PIP + DIP =				[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]	Hand impairment % *Convert above	

Total hand impairment (Add hand impairment % for thumb + index + middle + ring + little finger) = ___ / ___ %

Upper extremity impairment (*Convert total hand impairment % to upper extremity impairment %) = ___ / ___ %; enter on Part 2, Line II

if hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment:+ = ___ / ___ %

• Combined Values Chart; (p. 322-324)   *Use Table 1 (Digits to hand p. 18);   +Use Table 2 (Hand to upper extremity p. 19)   *Use Table 3 (p. 20)
** Courtesy of G. de Groot Swanson, MD

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Figure 1, p. 16

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand)   Side ☐ R ☐ L

Name _BARRY BOCA_   Age _24_ Sex ☒ M ☐ F   Dominant hand ☒ R ☐ L   Date _XX/XX/XXXX_

Occupation _DENTAL TECHNICIAN_   Diagnosis _DeQUERVAIR'S TENOSYNOVITIS_
S/P SURGICAL RELEASE

			Abnormal motion				Amputation	Sensory loss	Other disorders	Hand impairment%
			Record motion, ankylosis, and impairment %				Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%
			Flexion	Extension	Ankylosis	IMP%				
Thumb	IP	Angle°	90	10		1%				
		IMP%	1%	0%						
	MP	Angle°	50	0		1%				
		IMP%	1%	0%						
			Motion	Ankylosis	IMP%					
	CMC	Radial abduction	Angle°	70		0%				Abnormal motion [1] 3%
			IMP%	0%						Amputation [2] 0
		Adduction	CMS	1 CM (lack of)		0%				Sensory loss [3] 0
			IMP%	0%						Other disorders [4] 0
		Opposition	CMS	7 CM		1%				Digit impairment % • Combine 1, 2, 3, 4 3%
			IMP%	1%						
	Add impairment % CMC + MP + IP =	**3%**	[1]	IMP % = [2]	IMP % = [3]	IMP % = [4]				Hand impairment % *Convert above 1%

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Figure 1, p.16

Total hand impairment (Add hand impairment % for thumb + index + ring + little finger) = 1%
Upper extremity impairment (+Convert total impairment % to upper extremity impairment %) = 1% enter on Part 2, Line II
If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment+= 1%
*Combined Values Chart; (p. 322-324) *Use Table 1 (1Digits to hand p. 18); *Use Table 2 (Hand to upper extremity p. 19) * Use Table 3 (p. 20) **Courtesy of G. de Groot Swanson, MD

Division of Workers' Compensation

Any Questions about Thumb ROM?

Wrist Range of Motion

4 RANGES OF MOTION

Measure:

a) Flexion (Figure 24, p. 36)

b) Extension (Figure 24, p. 36)

c) Radial Deviation (Figure 27, p. 37)

d) Ulnar Deviation (Figure 27, p. 37)

Figure 24, p. 36

Figure 24. Wrist Flexion (above) and Extension (below).*
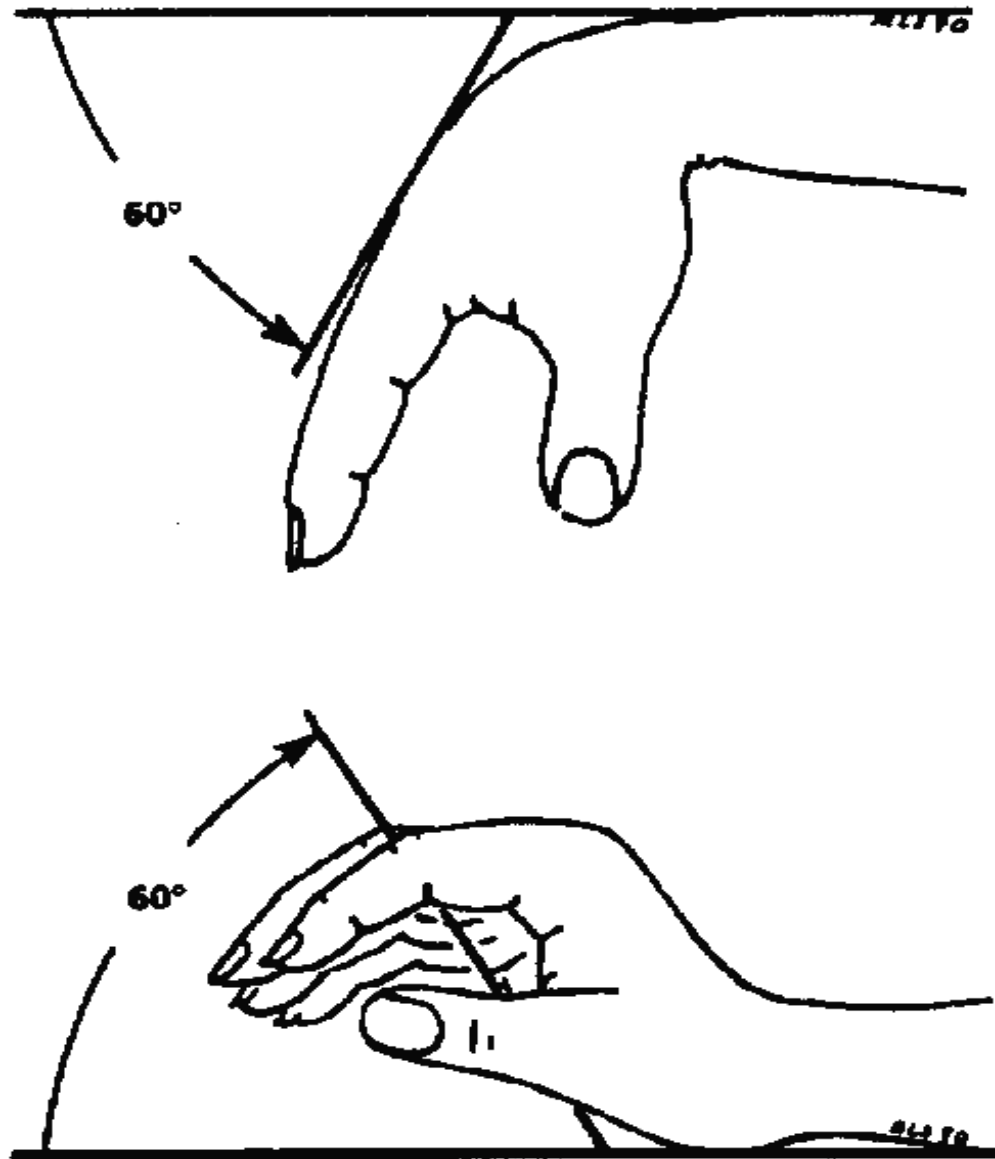
Figure 27, p. 37

Figure 27. Radial Deviation (left) and Ulnar Deviation (right) of Right Wrist*
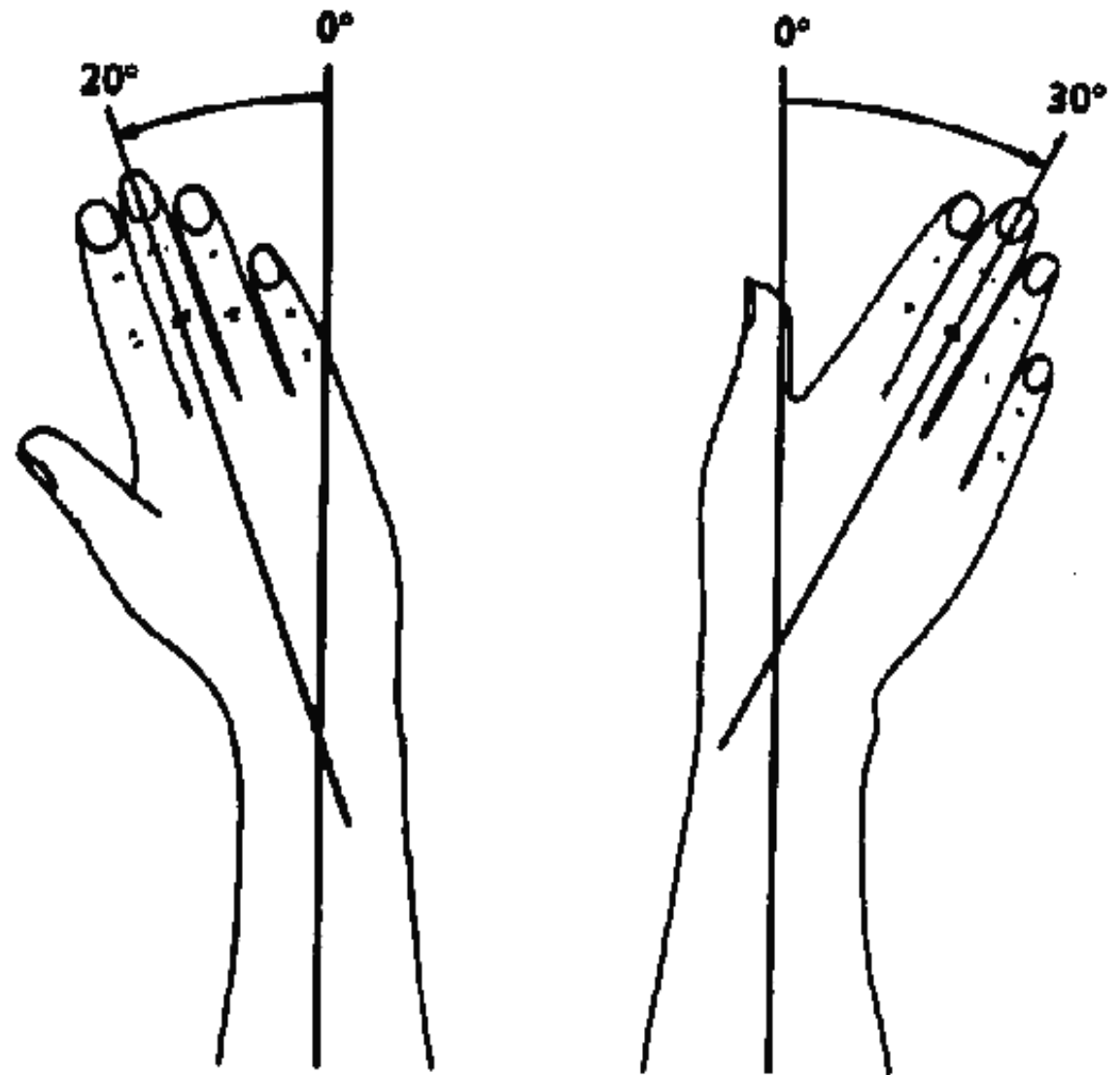
Wrist Range of Motion

- Determine impairment values based on pie charts Figure 26, p. 36 and Figure 29, p. 38

- **Round ROM to nearest 10° per written instructions for UD and RD, rather than 5° increments in Fig. 29**

  - Appeals Panel decision 022504-s

- **Add different motion impairments of wrist**

- **Use Figure 1** – **combine** with other UE impairments and convert to whole person using Table 3

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Figure 26, p. 36

Figure 26. Upper Extremity Impairments Due to Lack of Flexion and Extension of Wrist Joint. Relative value of this functional unit to upper extremity impairment is 42%.†
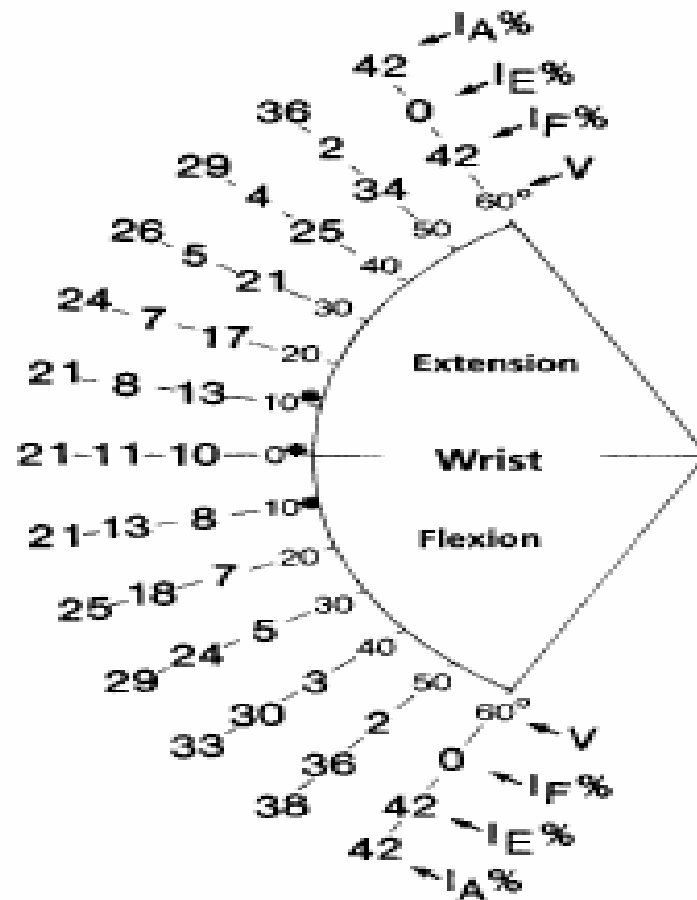
I_a% = Impairment due to ankylosis
I_e% = Impairment due to loss of extension
I_f% = Impairment due to loss of flexion
V = Measured angles of motion
* = Positions of function

†Data from Swanson, AB, Goran-Hagert, C, de Groot Swanson, G[31], p. 69, Fig. 4-23.

Figure 29, p. 38

Figure 29. Upper Extremity Impairments Due to Abnormal Radial and Ulnar Deviations of Wrist Joint. Relative value of this functional unit to upper extremity impairment is 18%.†

I_A% = Impairment due to ankylosis
I_{RD}% = Impairment due to loss of radial deviation
I_{UD}% = Impairment due to loss of ulnar deviation
V = Measured angles of motion
* = Positions of function

†Data from Swanson, AB, Goran-Hagert, C, de Groot Swanson, G″, p. 64, Fig. 4-24.

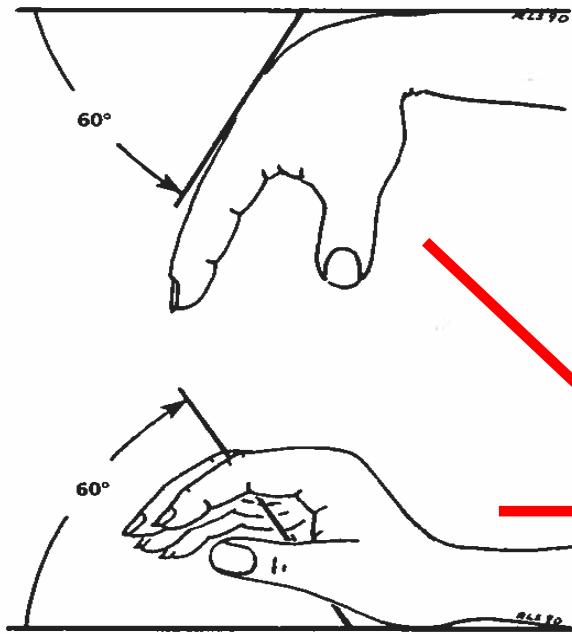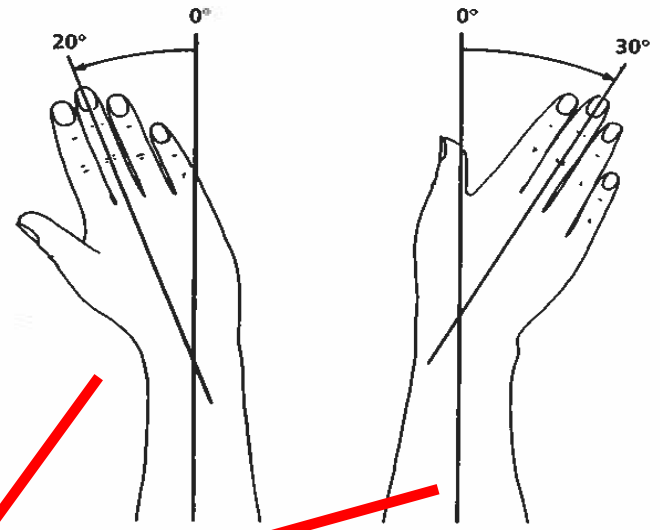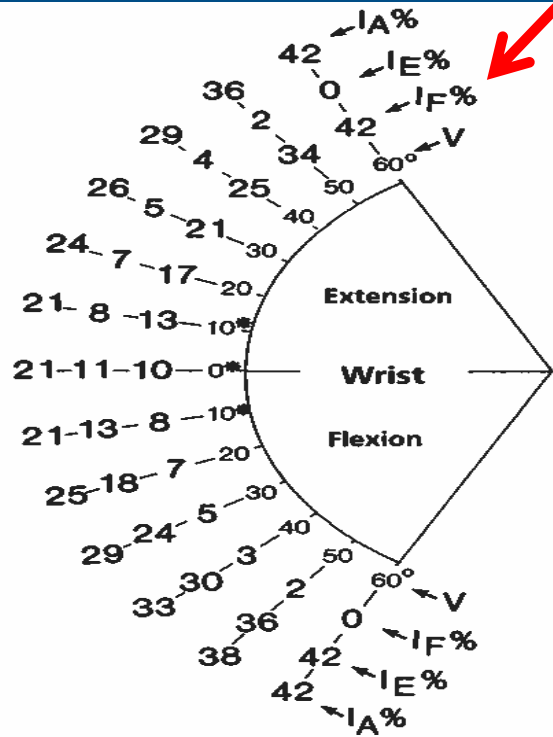**Fig. 24, p. 36**
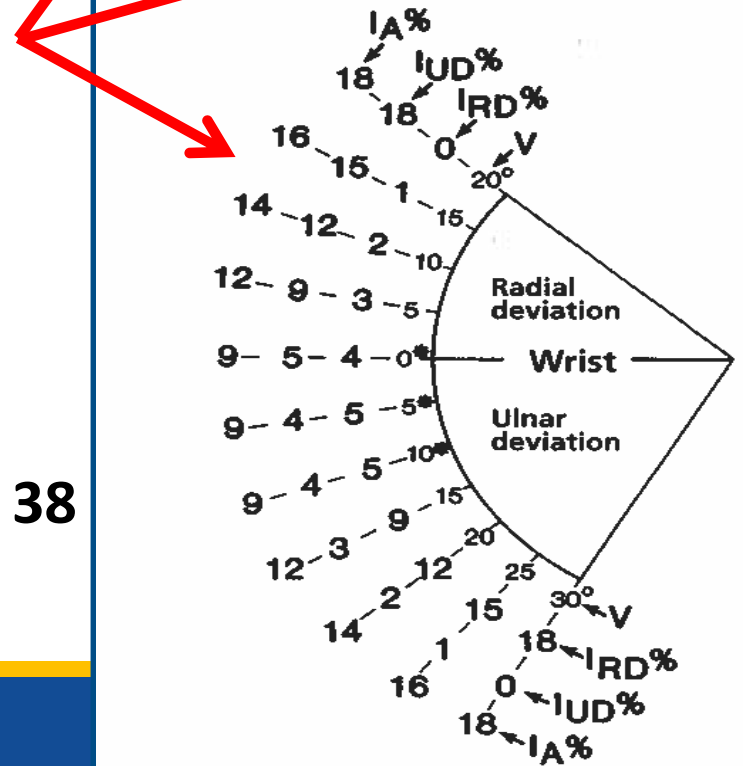
Fig. 27, p. 37

Fig. 26, p. 36

Fig. 29, p. 38

Table 3, p. 20

Table 3. Relationship of Impairment of the Upper Extremity to Impairment of the Whole Person.

% Impairment of		% Impairment of		% Impairment of	
Upper extremity	Whole person	Upper extremity	Whole person	Upper extremity	Whole person
0 = 0		35 = 21		70 = 42	
1 = 1		36 = 22		71 = 43	
2 = 1		37 = 22		72 = 43	
3 = 2		38 = 23		73 = 44	
4 = 2		39 = 23		74 = 44	
5 = 3		40 = 24		75 = 45	
6 = 4		41 = 25		76 = 46	
7 = 4		42 = 25		77 = 46	
8 = 5		43 = 26		78 = 47	
9 = 5		44 = 26		79 = 47	
10 = 6		45 = 27		80 = 48	
11 = 7		46 = 28		81 = 49	
12 = 7		47 = 28		82 = 49	
13 = 8		48 = 29		83 = 50	
14 = 8		49 = 29		84 = 50	
15 = 9		50 = 30		85 = 51	
16 = 10		51 = 31		86 = 52	
17 = 10		52 = 31		87 = 52	
18 = 11		53 = 32		88 = 53	
19 = 11		54 = 32		89 = 53	
20 = 12		55 = 33		90 = 54	
21 = 13		56 = 34		91 = 55	
22 = 13		57 = 34		92 = 55	
23 = 14		58 = 35		93 = 56	
24 = 14		59 = 35		94 = 56	
25 = 15		60 = 36		95 = 57	
26 = 16		61 = 37		96 = 58	
27 = 16		62 = 37		97 = 58	
28 = 17		63 = 38		98 = 59	
29 = 17		64 = 38		99 = 59	
30 = 18		65 = 39		100 = 60	
31 = 19		66 = 40			
32 = 19		67 = 40			
33 = 20		68 = 41			
34 = 20		69 = 41			

What about supination and pronation for wrist injuries?

- Pronation and supination discussed under elbow/forearm ROM

- See example of Colles fracture on p. 72

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J00225

J00210

J00240

J00245

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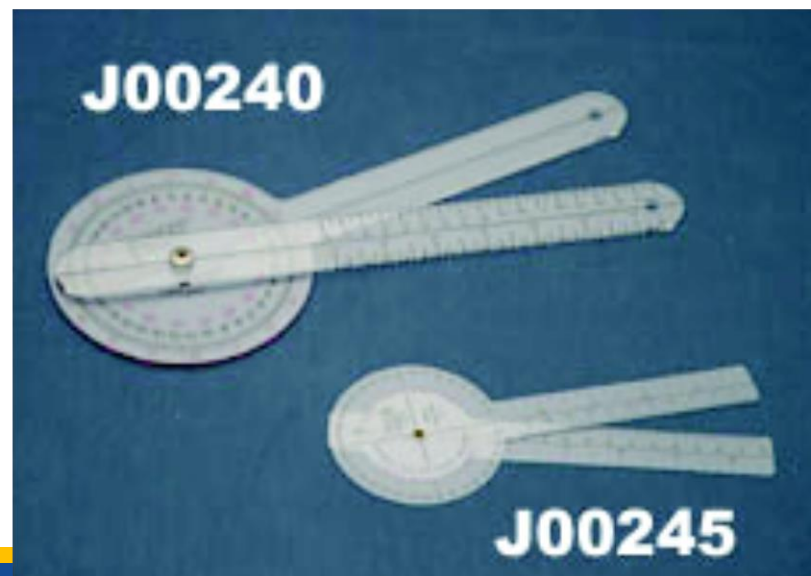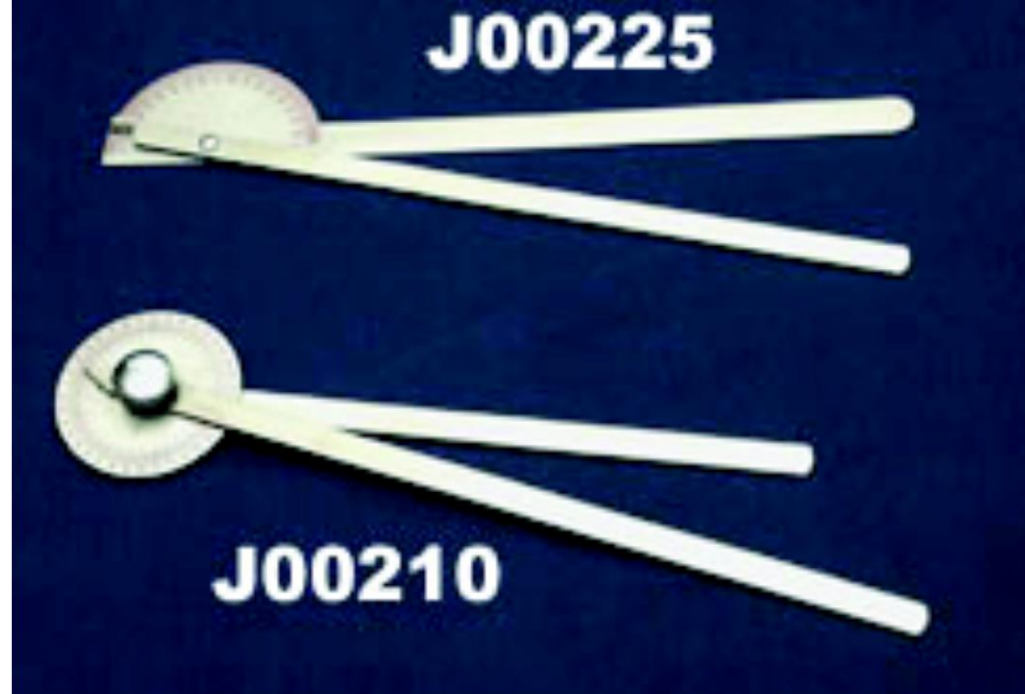
Elbow Range of Motion
Measurements

- Measure based on Fig. 30, p. 39 and Fig. 33, p. 40

- Measure:
  1. Flexion
  2. Extension
  3. Pronation
  4. Supination

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Elbow Range of Motion
Impairment Values

- Determine impairment values based on pie charts Fig. 32, p. 40 and Fig. 35, p. 41.

- **Use Figure 1 - combine** with other UE impairments and convert to whole person using Table 3, P. 20.

Fig.30, p.39

90° 40°
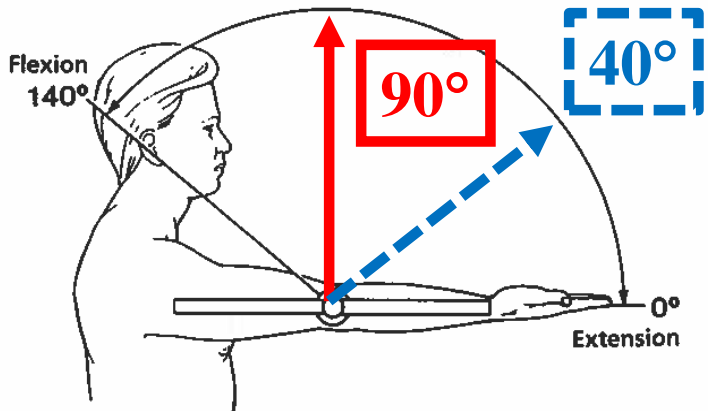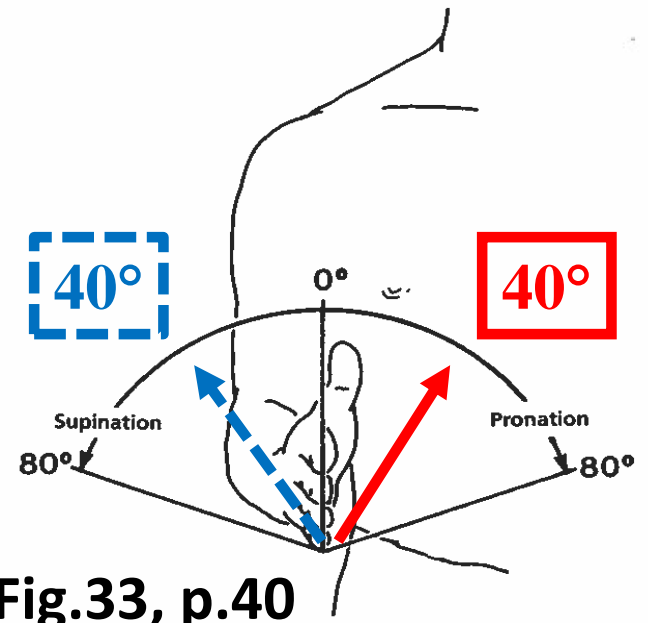
Fig.33, p.40
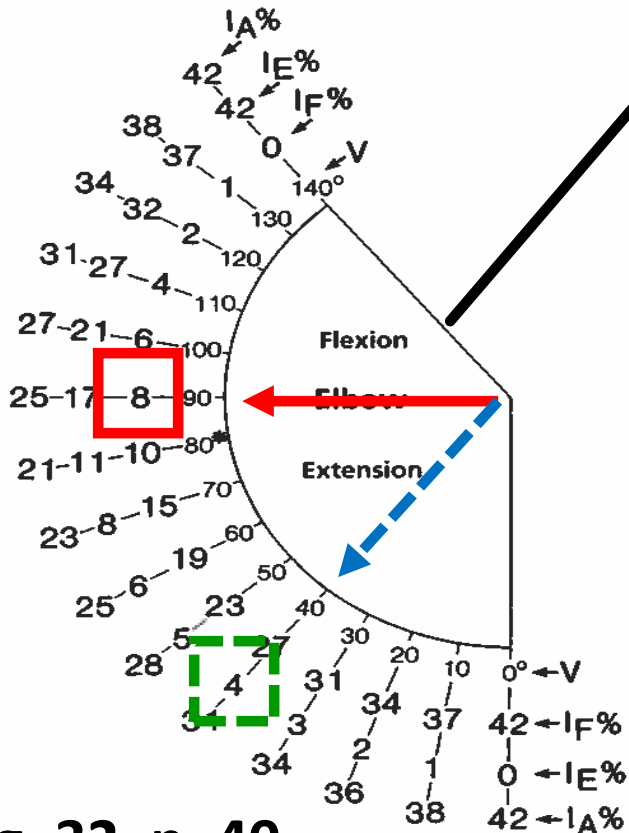
40° 40°

$$8 + 4 = 12\%$$

$$+$$

$$2 + 3 = 5\%$$

$$12 + 5 = 17\% \text{ Elbow}$$

Fig. 32, p. 40
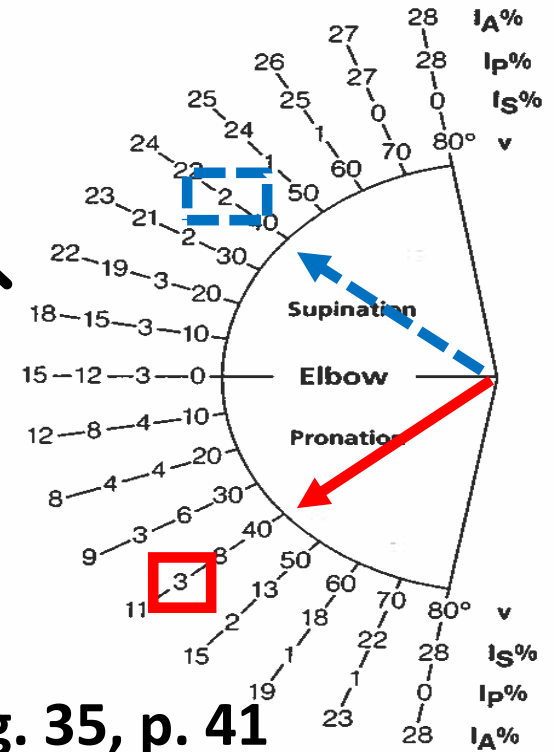
Fig. 35, p. 41

Shoulder Range of Motion

6 Measurements of Range of Motion

1)   Flexion (Fig. 36, p. 42)

2)   Extension (Fig. 36, p. 42)

3)   Adduction (Fig. 39, p. 43)

4)   Abduction (Fig. 39, p. 43)

5)   Internal Rotation (Fig. 42, p. 44)

6)   External Rotation (Fig. 42, p. 44)

ADD **Range of Motion deficits**

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Shoulder Range of Motion

Determine Impairment Values Based on Pie Charts:

1) Flexion (Fig. 38, P. 43)

2) Extension (Fig. 38, P. 43)

3) Adduction (Fig. 41, P. 44)

4) Abduction (Fig. 41, P. 44)

5) Internal Rotation (Fig. 44, P. 45)

6) External Rotation (Fig. 44, P. 45)

- **Use Figure 1** - **combine** with other UE impairments and convert to Whole Person using Table 3, P. 20.

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Fig. 36, p. 42 Shoulder Extension and Flexion

Fig.39, p. 43 Shoulder Abduction and Adduction
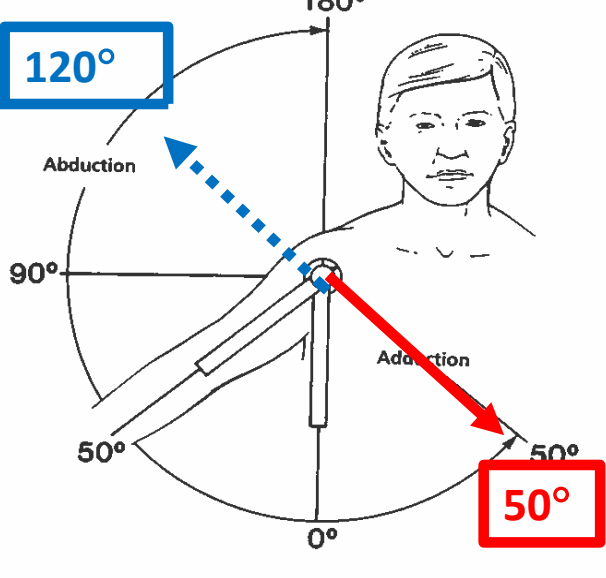
Fig. 42, p. 44 Shoulder External Rotation and Internal

Fig. 38, p. 43

Fig. 41, p. 44

Fig. 44, p. 45

Upper Extremity Case 1 MMI/IR (The Sequel)

- Crush injury Right wrist and upper arm

- Open fractures humerus and radius

- 2nd DD appointment (+20wks later)

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Upper Extremity Case 1 MMI/IR (The Sequel)

Designated Doctor Medical History

- Extra 4 months of PT helped a lot. UE is stronger and more mobile.

- IE is back at work full duty but can't reach overhead the same.

Upper Extremity Case 1 MMI/IR (The Sequel)

Designated Doctor Physical Examination

Shoulder ROM

- Flexion 130°

- Extension 40°

- Abduction 120°

- Adduction 50°

- IR 20°

- ER 60°

Upper Extremity Case 1 MMI/IR (The Sequel)

Designated Doctor Physical Examination

- Wrist ROM

  - Flexion 30°

  - Extension 40°

  - Radial deviation 10°

  - Ulnar deviation 20°

- Forearm/elbow ROM

  - Pronation 80°

  - Supination 70°

Upper Extremity Case 1 MMI/IR (The Sequel)

Designated Doctor Physical Examination

- 5/5 strength right wrist and shoulder with manual muscle testing

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Upper Extremity Case 1 MMI/IR (The Sequel)

Designated Doctor Physical Examination

- Based on the medical records and your physical examination of the injured employee, what is the compensable injury for certifying MMI and IR?

Upper Extremity Case 1 MMI/IR (The Sequel)

Question for the Designated Doctor:

On the MMI date, what is the whole person IR?

Show your work!

6. On the Date of MMI, what is the whole person IR?

A. 23%

B. 14%

C. 13%

D. 11%

Impairment Rating
ROM loss
Shoulder and wrist

Fig. 36, p. 42 Shoulder Extension and Flexion

130°
40°

Fig.39, p. 43 Shoulder Abduction and Adduction

120°
50°

Fig. 42, p. 44 Shoulder External Rotation and Internal

60°
20°

Fig. 38, p. 43

Fig. 41, p. 44

Fig. 44, p. 45

Shoulder		Flexion	Extension	Ankylosis	IMP%
	Angle°	130°	40°		4%
	IMP%	3%	1%		
		Add	Abd	Ankylosis	IMP%
	Angle°	50°	120°		3%
	IMP%	0%	3%		
		Int Rot	Ext Rot	Ankylosis	IMP%
	Angle°	20°	60°		4%
	IMP%	4%	0%		

Add IMP% F/E + Add/Abd + IR/ER =   11   [1]

IMP% =

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Figure 24. Wrist Flexion (above) and Extension (below)*

30°

40°

Fig. 24 (p. 36)

Fig. 27 (p. 37)

Figure 27. Radial Deviation (left) and Ulnar Deviation (right) of Right Wrist*

10°

20°

$$5 + 4 = 9\%$$

$$+$$

$$2 + 2 = 4\%$$

$$9 + 4 = 13\% \text{ UE}$$

Fig. 26 (p. 36)

Fig. 29 (p. 38)

Figure 33, p. 40

Pronation and Supination of Forearm

Figure 33. Pronation and Supination of Forearm.

70°

80°
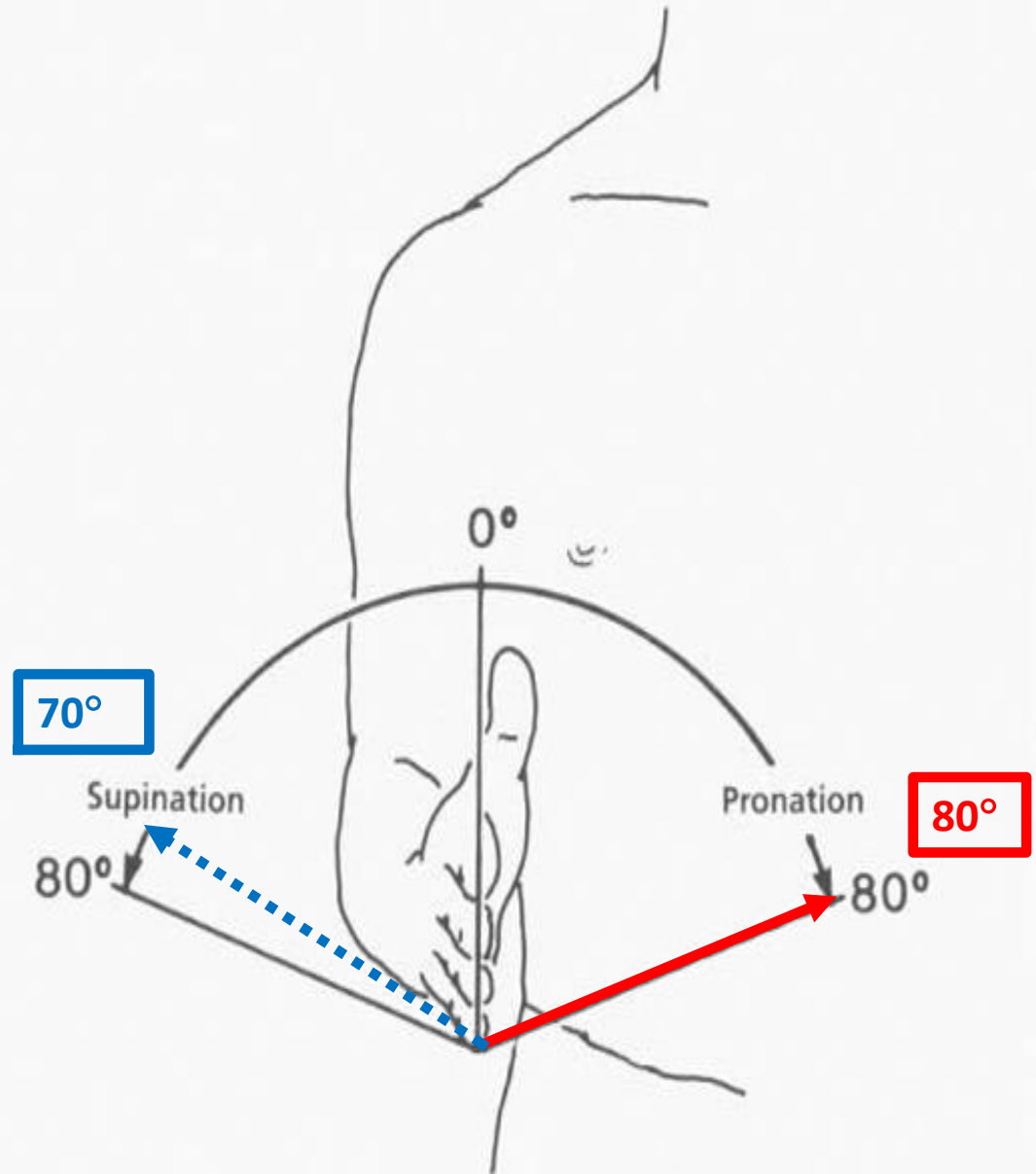
Figure 35, p. 41

Upper Extremity Impairments Due to Lack of Pronation and Supination

Figure 35. Upper Extremity Impairments Due to Lack of Pronation and Supination. Relative value of this functional unit to upper extremity impairment is 28%.†

$I_a\%$ = Impairment due to ankylosis
$I_r\%$ = Impairment due to loss of pronation
$I_s\%$ = Impairment due to loss of supination
V = Measured angles of motion
* = Position of function

Figure 1. Upper Extremity Impairment Evaluation Record**–Part 1 (Hand) Side □ R □ L

Name_____ Age____ Sex □ M □ F Dominant hand □ R □ L Date_____

Occupation_____ Diagnosis_____

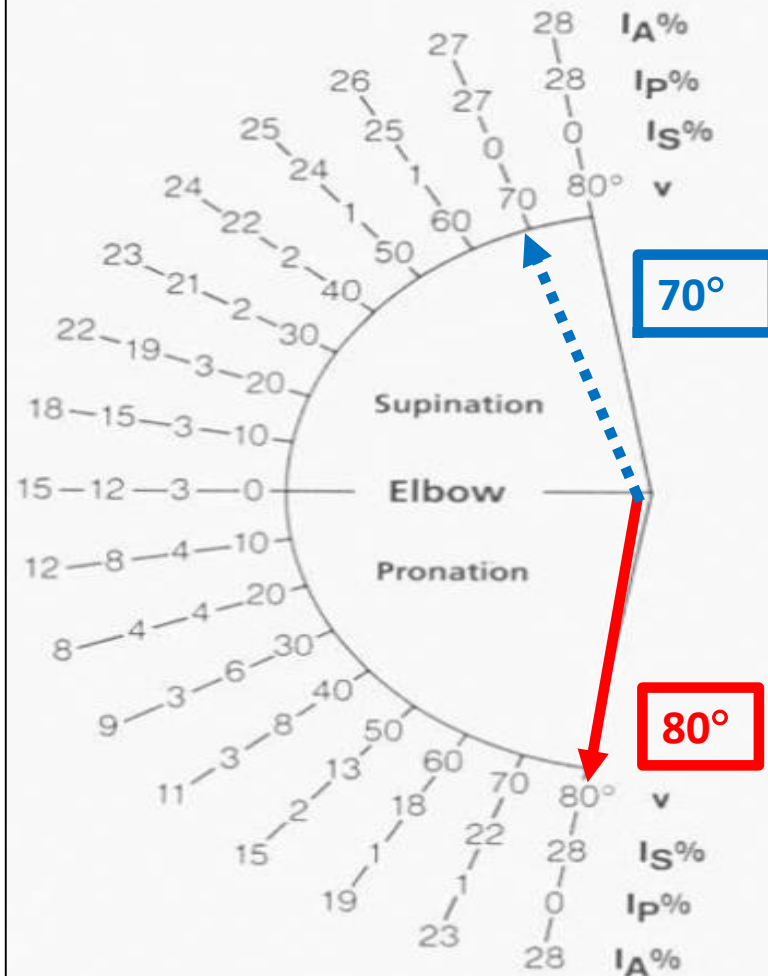|		Abnormal motion				Amputation	Sensory loss	Other disorders	Hand impairment%
		Record motion, ankylosis, and impairment %				Mark level & impairment %	Mark type, level, & impairment %	List type & impairment %	• Combine digit IMP% *Convert to hand IMP%
		Flexion	Extension	Ankylosis	IMP%				
Thumb	IP Angle°								
	IP IMP%								
	MP Angle°								
	MP IMP%								
		Motion	Ankylosis	IMP%					
	Radial abduction Angle°								Abnormal motion [1]
	Radial abduction IMP%								Amputation [2]
	Adduction CMS								Sensory loss [3]
	Adduction IMP%								Other disorders [4]
	Opposition CMS					R L	R L		Digit impairment % • Combine 1, 2, 3, 4
	Opposition IMP%								
	Add impairment % CMC + MP + IP =			[1]		[2] IMP % =	[3] IMP % =	[4] IMP % =	Hand impairment % *Convert above
		Flexion	Extension	Ankylosis	IMP%				
Index	DIP Angle°								Abnormal motion [1]
	DIP IMP%								Amputation [2]
	PIP Angle°								Sensory loss [3]
	PIP IMP%								Other disorders [4]
	MP Angle°								Digit impairment % • Combine 1, 2, 3, 4
	MP IMP%								
	• Combine impairment % MP + PIP + DIP =			[1]		[2] IMP % =	[3] IMP % =	[4] IMP % =	Hand impairment % *Convert above
Middle	DIP Angle°								Abnormal motion [1]
	DIP IMP%								Amputation [2]
	PIP Angle°								Sensory loss [3]
	PIP IMP%								Other disorders [4]
	MP Angle°								Digit impairment % • Combine 1, 2, 3, 4
	MP IMP%								
	• Combine impairment % MP + PIP + DIP =			[1]		[2] IMP % =	[3] IMP % =	[4] IMP % =	Hand impairment % *Convert above
Ring	DIP Angle°								Abnormal motion [1]
	DIP IMP%								Amputation [2]
	PIP Angle°								Sensory loss [3]
	PIP IMP%								Other disorders [4]
	MP Angle°								Digit impairment % • Combine 1, 2, 3, 4
	MP IMP%								
	• Combine impairment % MP + PIP + DIP =			[1]		[2] IMP % =	[3] IMP % =	[4] IMP % =	Hand impairment % *Convert above
Little	DIP Angle°								Abnormal motion [1]
	DIP IMP%								Amputation [2]
	PIP Angle°								Sensory loss [3]
	PIP IMP%								Other disorders [4]
	MP Angle°								Digit impairment % • Combine 1, 2, 3, 4
	MP IMP%								
	• Combine impairment % MP + PIP + DIP =			[1]		[2] IMP % =	[3] IMP % =	[4] IMP % =	Hand impairment % *Convert above

Total hand impairment (Add hand impairment % for thumb + index + middle + ring + little finger) =	%
Upper extremity impairment (†Convert total hand impairment % to upper extremity impairment %) =	%; enter on Part 2, Line II
If hand region impairment is only impairment, convert upper extremity impairment to whole-person impairment:‡ =	%

• Combined Values Chart; (p. 322-324)   *Use Table 1 (Digits to hand p. 18);   †Use Table 2 (Hand to upper extremity p. 19)   ‡Use Table 3 (p. 20)
** Courtesy of G. de Groot Swanson, MD

Figure 1. Upper Extremity Impairment Evaluation Record–Part 2 (Wrist, elbow, and shoulder) Side □ R □ L

Name_____ Age____ Sex □ M □ F Dominant hand □ R □ L Date_____

Occupation_____ Diagnosis_____

		Abnormal motion				Other disorders	Regional impairment %	Amputation
		Record motion, ankylosis and impairment %				List type & impairment %	• Combine [1] + [2]	Mark level & impairment %
		Flexion	Extension	Ankylosis	IMP%			
Wrist	Angle°							
	IMP%							
		RD	UD	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + RD/UD =			[1]		IMP% =	[2]	
		Flexion	Extension	Ankylosis	IMP%			
Elbow	Angle°							
	IMP%							
		Pro	Sup	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + PRO/SUP =			[1]		IMP% =	[2]	
		Flexion	Extension	Ankylosis	IMP%			
Shoulder	Angle°							
	IMP%							
		Add	Abd	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Int Rot	Ext Rot	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + Add/Abd + IR/ER =			[1]		IMP% =	[2]	IMP %

I. Amputation impairment (other than digitis)	=
II. Regional impairment of upper extremity • (Combine hand ____% + wrist ____% + elbow ____% + shoulder ____%)	=
III. Peripheral nerve system impairment	=
IV. Peripheral vascular system impairment	=
V. Other disorders (not included in regional impairment)	=
Total upper extremity impairment (• Combine I + II + III + IV + V)	=
Impairment of the whole person (Use Table 3 p. 20)	=

If both limbs are involved, calculate the whole-person impairment for each on a separate chart and *combine* the percents (Combined Values Chart).

Figure 1, p. 17

- Upper Extremity Impairment Evaluation Record Part 2 (Wrist, elbow, and shoulder)

Figure 1. Upper Extremity Impairment Evaluation Record—**Part 2 (Wrist, elbow, and shoulder)** Side ☐ R ☐ L

Name_____ Age_____ Sex ☐ M ☐ F Dominant hand ☐ R ☐ L Date_____

Occupation_____ Diagnosis_____

	Abnormal motion					Other disorders	Regional impairment %	Amputation
	Record motion, ankylosis and impairment %					List type & impairment %	• Combine [1] + [2]	Mark level & impairment %
Wrist		Flexion	Extension	Ankylosis	IMP%			
	Angle°							
	IMP%							
		RD	UD	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + RD/UD =				[1]	IMP% = [2]		
Elbow		Flexion	Extension	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Pro	Sup	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + PRO/SUP =				[1]	IMP% = [2]		
Shoulder		Flexion	Extension	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Add	Abd	Ankylosis	IMP%			
	Angle°							
	IMP%							
		Int Rot	Ext Rot	Ankylosis	IMP%			
	Angle°							
	IMP%							
	Add IMP% F/E + Add/Abd + IR/ER =				[1]	IMP% = [2]		IMP %

I. Amputation impairment (other than digitis) =

II. Regional impairment of upper extremity
   • (Combine hand _____% + wrist _____% + elbow _____% + shoulder _____%) =

III. Peripheral nerve system impairment =

IV. Peripheral vascular system impairment =

V. Other disorders (not included in regional impairment) =

Total upper extremity impairment (• Combine I + II + III + IV + V) =

Impairment of the whole person (Use Table 3 p. 20) =

If both limbs are involved, calculate the whole-person impairment for each on a separate chart and *combine* the percents (Combined Values Chart).
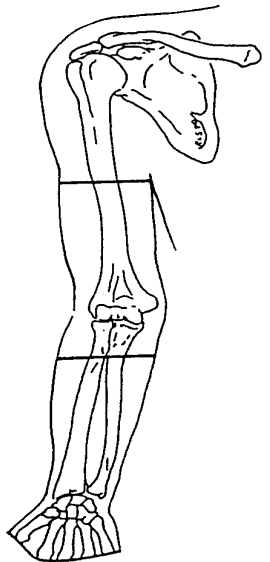
	Abnormal motion				Other disord...
	Record motion, ankylosis and impairment %				List typ... impairm...
Wrist		Flexion	Extension	Ankylosis	IMP%	
	Angle°	**30°**	**40°**		**9**	
	IMP%	**5**	**4**			
		RD	UD	Ankylosis	IMP%	
	Angle°	**10°**	**20°**		**4**	
	IMP%	**2**	**2**			

Add IMP% F/E + RD/UD = **13** [1]

IMP% ...

Elbow		Flexion	Extension	Ankylosis	IMP%
	Angle°				
	IMP%				
		Pro	Sup	Ankylosis	IMP%
	Angle°	80°	70°		0
	IMP%	0	0		

Add IMP% F/E + PRO/SUP = 0

[1]

Whole Person Concept
Upper Extremity

Combined Values Chart

Different Joints

Combine:

13% (Wrist) with

11% (Shoulder) = 23% UE Impairment

Relationship of Impairment of the Upper Extremity to Impairment of Whole Person Table 3, P. 20

- **Convert: 23% UE = 14% Whole Person**

Table 3. Relationship of Impairment of the Upper Extremity to Impairment of the Whole Person.

% Impairment of		% Impairment of		% Impairment of	
Upper extremity	Whole person	Upper extremity	Whole person	Upper extremity	Whole person
0 = 0		35 = 21		70 = 42	
1 = 1		36 = 22		71 = 43	
2 = 1		37 = 22		72 = 43	
3 = 2		38 = 23		73 = 44	
4 = 2		39 = 23		74 = 44	
5 = 3		40 = 24		75 = 45	
6 = 4		41 = 25		76 = 46	
7 = 4		42 = 25		77 = 46	
8 = 5		43 = 26		78 = 47	
9 = 5		44 = 26		79 = 47	
10 = 6		45 = 27		80 = 48	
11 = 7		46 = 28		81 = 49	
12 = 7		47 = 28		82 = 49	
13 = 8		48 = 29		83 = 50	
14 = 8		49 = 29		84 = 50	
15 = 9		50 = 30		85 = 51	
16 = 10		51 = 31		86 = 52	
17 = 10		52 = 31		87 = 52	
18 = 11		53 = 32		88 = 53	
19 = 11		54 = 32		89 = 53	
20 = 12		55 = 33		90 = 54	
21 = 13		56 = 34		91 = 55	
22 = 13		57 = 34		92 = 55	
23 = 14		58 = 35		93 = 56	
24 = 14		59 = 35		94 = 56	
25 = 15		60 = 36		95 = 57	
26 = 16		61 = 37		96 = 58	
27 = 16		62 = 37		97 = 58	
28 = 17		63 = 38		98 = 59	
29 = 17		64 = 38		99 = 59	
30 = 18		65 = 39		100 = 60	
31 = 19		66 = 40			
32 = 19		67 = 40			
33 = 20		68 = 41			
34 = 20		69 = 41			

I. Amputation impairment (other than digitis) =

II. Regional impairment of upper extremity
• (Combine hand _____% + wrist **13**% + elbow **0**% + shoulder **11**%) = **23**

Combined Values chart Pgs 322/3

III. Peripheral nerve system impairment =

IV. Peripheral vascular system impairment =

V. Other disorders (not included in regional impairment) =

Total upper extremity impairment (• Combine I + II + III + IV + V) =
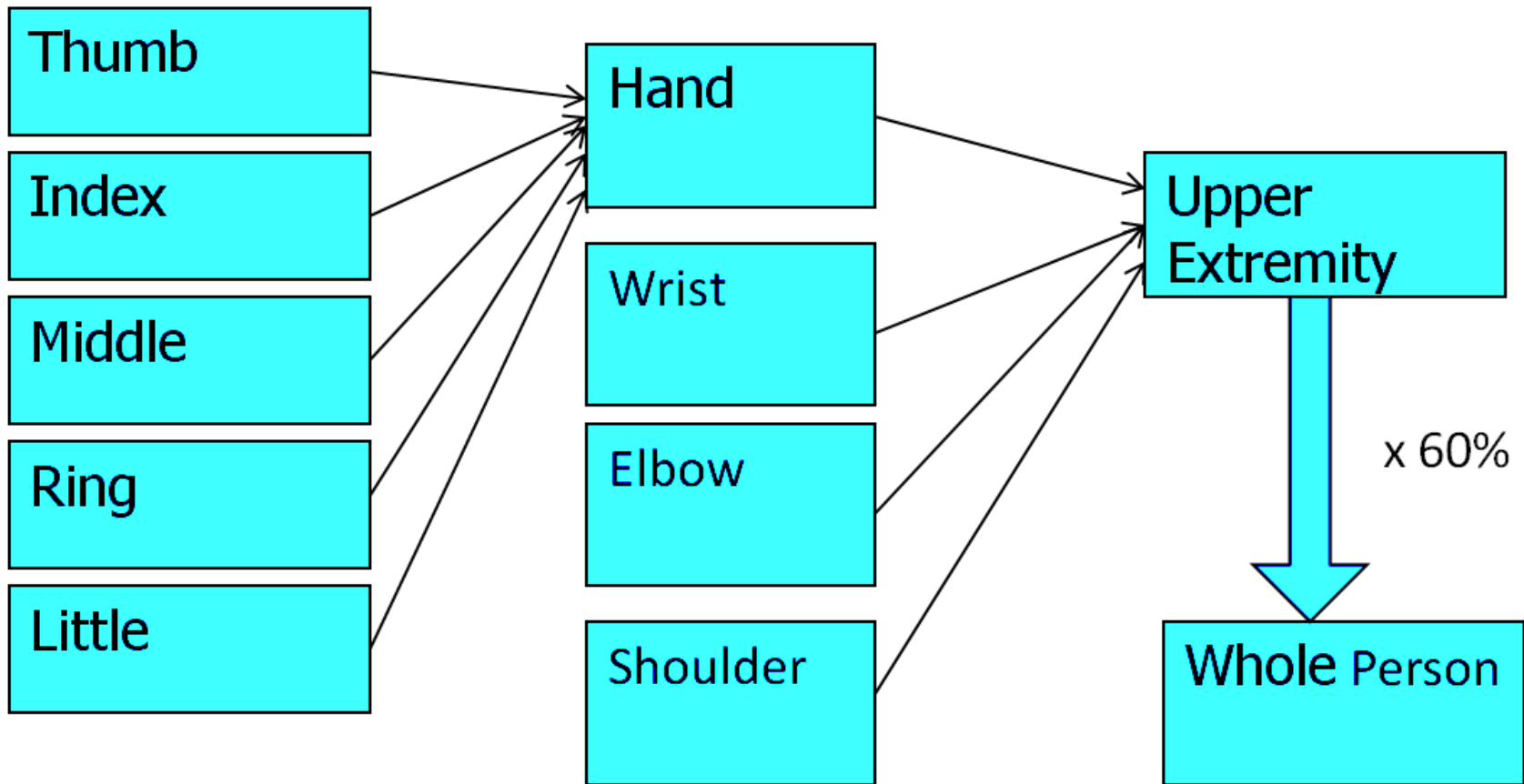
Impairment of the whole person (Use Table 3 p. 20) = **14%**

If both limbs are involved, calculate the whole-person impairment for each on a separate chart and *combine* the percents (Combined Values Chart).

Any Questions about Shoulder or Wrist ROM?

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Hand and Upper Extremity Methods for Evaluating Impairment

- Amputation
- Sensory loss of digits
- ROM
- **Peripheral nerve disorders**
  - Cervical Spinal Nerve Roots
  - Brachial Plexus
  - Major Peripheral Nerves
- Vascular Disorders
- "Other Disorders"

Peripheral Nerve Disorders

- **Section 3.1k P. 46** for the Upper Extremity has specific Tables.

- **Three Main Areas:**
      1) Cervical Spinal Nerve Roots
      2) Brachial Plexus
      3) Major Peripheral

Peripheral Nerve Disorders

- Restricted UE ROM strictly due to peripheral nerve lesion should **not** be rated with ROM method - p. 46.

- If restricted ROM is **not** strictly due to peripheral nerve disorder, then ROM can be combined with peripheral nerve disorder impairment.

- Rate pain/sensory deficits and/or motor deficits.

Peripheral Nerve Disorders

- Pain/Sensory deficits p. 46

  - How does deficit interfere with ADL that is present at MMI?

  - Does it follow a defined, specific anatomic distribution? (nerve root, plexus, peripheral nerve)

  - Is the injury/condition consistent with a peripheral nerve disorder?

Peripheral Nerve Disorders T. 11, P. 48

Determining Impairment of the Upper Extremity Due to Pain or Sensory Deficit Resulting from Peripheral Nerve Disorders.

a. Classification

Grade	Description of sensory deficit or pain	% Sensory deficit
1	No loss of sensibility, abnormal sensation, or pain	0
2	Decreased sensibility with or without abnormal sensation or pain, which is forgotten during activity	1 - 25
3	Decreased sensibility with or without abnormal sensation or pain, which interferes with activity	26 - 60
4	Decreased sensibility with or without abnormal sensation or pain, which may prevent activity, and/or minor causalgia	61 - 80
5	Decreased sensibility with abnormal sensations and severe pain, which prevents activity, and/or major causalgia	81 - 100

b. Procedure

1. Identify the area of involvement using the dermatome charts (Figs. 45 and 46, pp. 50 and 52).
2. Identify the nerve(s) that innervate the area(s) (Table 10, Figs. 45 through 47, pp. 47, 50, 52, and 53).
3. Grade the severity of the sensory deficit or pain according to the classification given above.
4. Find the maximum impairment of the upper extremity due to sensory deficit or pain for each structure involved: spinal nerves (Table 13, p. 51), brachial plexus (Table 14, p. 52), and major peripheral nerves (Table 15, p. 54).
5. Multiply the severity of the sensory deficit by the maximum impairment value to obtain the upper extremity impairment for each structure involved.

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Instructions from p. 48

Example: After an injury to his elbow, a man continued to have pain and abnormal sensations (minor causalgia) in the medial aspect of his right forearm that prevented activity.

1. Area of involvement is the medial aspect of right forearm (Fig. 45, p. 50).

2. Nerve involved is the medial antebrachial cutaneous (Table 10, p. 47).

3. Maximum loss of function due to sensory deficit is 5% (Table 15, p. 54).

4. Grade of sensory deficit or pain is 61% to 80% (Table 11a right); use maximum value.

5. Impairment of the upper extremity is calculated to be 80% x 5%, or 4%. This is equivalent to a 2% whole-person impairment (Table 3, p. 20).

Peripheral Nerve Disorders

Motor deficits

- Is there a loss of strength, or specific muscle loss of function, that is present and reproducible on the clinical exam?

- Is this consistent with the injury, clinical condition and prior medical records?

- Is the strength loss in a defined, specific anatomic pathway of the injured nerve? (nerve root, plexus, peripheral nerve)

- **Do not** combine with loss of strength section 3.1m (Impairment due to other disorders of the UE) (which is rarely used)

Peripheral Nerve Disorders
T. 12, P. 49

Determining Impairment of the Upper Extremity Due to Loss of Power and Motor Deficits Resulting from Peripheral Nerve Disorders Based on Individual Muscle Rating.

a. Classification

Grade	Description of muscle function	% Motor deficit
5	Active movement against gravity with full resistance	0
4	Active movement against gravity with some resistance	1 - 25
3	Active movement against gravity only, without resistance	26 - 50
2	Active movement with gravity eliminated	51 - 75
1	Slight contraction and no movement	76 - 99
0	No contraction	100

b. Procedure

1. Identify the motion involved, such as flexion, extension, etc.
2. Identify the muscle(s) performing the motion and the motor nerve(s) involved.
3. Grade the severity of motor deficit of individual muscles according to the classification given above.
4. Find the maximum impairment of the upper extremity due to motor deficit for each nerve structure involved: spinal nerves (Table 13, p. 51), brachial plexus (Table 14, p. 52), and major peripheral nerves (Table 15, p. 54).
5. Multiply the severity of the motor deficit by the maximum impairment value to obtain the upper extremity impairment for each structure involved.

Text from p. 49, below Table 12

Motor deficit calculation:

1. Muscle involved is the deltoid, which is innervated by the axillary nerve (Table 10, p. 47).

2. Maximum upper extremity impairment due to motor deficit of the axillary nerve is 35% (Table 15, p. 54).

3. Grade of loss of muscle strength is 25% (Table 12a above) Use maximum value.

4. Impairment of the upper extremity due to motor deficit of the axillary nerve is 25% x 35%, or 9%.

Peripheral Nerve Disorders

Cervical Spinal Nerve Roots
- Determine that there is a specific single spinal nerve root injury/deficit, that is not ratable per the Spine section.
- Estimate the sensory deficit/pain from Table 11, p. 48 and motor deficit from Table 12, p. 49.
- Multiply the severity of the sensory or motor deficit by the appropriate percentage
- **Combine** the sensory and motor deficits to give an UE IR value.

Figure 1 – **combine** with other UE impairments and convert to Whole Person
using T. 3, P. 20.

Peripheral Nerve Disorders
T. 13, P. 51

Maximum Upper Extremity Impairment Due to Unilateral Sensory or Motor Deficits of Individual Spinal Nerves or to *Combined* Deficits.

Maximum % upper extremity impairment*			
Spinal nerve	Due to sensory deficit or pain†	Due to motor deficit‡	Due to *combined* motor and sensory deficits
C5	5	30	34
C6	8	35	40
C7	5	35	38
C8	5	45	48
T1	5	20	24

Peripheral Nerve Disorders

Brachial Plexus

- Determine that there is a specific brachial plexus injury/deficit.
- Estimate the sensory deficit/pain from T. 11, P. 48 and motor deficit from T. 12, P. 49.
- Multiply the severity of the sensory or motor deficit by the appropriate percentage from T. 14, P.52.
- **Combine** the sensory and motor deficits to give an upper extremity impairment rating value.

Use Fig. 1 - combine with other UE impairments and convert to Whole Person using Table 3, P. 20.

Peripheral Nerve Disorders
T. 14, P. 52

Maximum Upper Extremity Impairments Due to Unilateral Sensory or Motor Deficits of Brachial Plexus, or to Combined Deficits.

Maximum % upper extremity impairment*			
	Due to sensory deficit or pain †	Due to motor deficit ‡	Due to *combined* motor and sensory deficits
Brachial plexus (C5 through C8, T1)	100	100	100
Upper trunk (C5, C6), Erb-Duchenne	25	75	81
Middle trunk (C7)	5	35	38
Lower trunk (C8, T1) Dejerine-Klumpke	20	70	76

Peripheral Nerve Disorders

Major Peripheral Nerves

- Determine that there is a specific peripheral injury/deficit
- Identify the nerve involved and the level of the lesion per T. 10, P. 47 and Figs. 45 & 48 (PP. 50 & 55)
- Estimate the sensory deficit/pain from T. 11, P. 48 and motor deficit from T. 12, P. 49
- Multiply the severity of the sensory or motor deficit by the appropriate percentage from T. 15, P.54
- For mixed nerves, combine the sensory and motor deficits to give an UE IR value
- If more than one nerve is involved combine the UE values for each nerve

Use Fig. 1 – combine with other UE impairments and convert to Whole Person using Table 3

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Decreased sensation to median nerve distribution of the palmar aspects of the radial and ulnar distributions right thumb, index and middle fingers = 36% UE

Nerve	Maximum % upper extremity impairment*		
	Due to sensory deficit or pain †	Due to motor deficit ‡	Due to *combined* motor and sensory deficits
Pectorals (medial and lateral)	0	5	5
Axillary	5	35	38
Dorsal scapular	0	5	5
Long thoracic	0	15	15
Medial antebrachial cutaneous	5	0	5
Medial brachial cutaneous	5	0	5
Median (above midforearm)	38	44	65
Median (anterior interosseous branch)	0	15	15
Median (below midforearm)	38	10	44
Radial palmar digital of thumb	7	0	7
Ulnar palmar digital of thumb	11	0	11
Radial palmar digital of index finger	5	0	5
Ulnar palmar digital of index finger	4	0	4
Radial palmar digital of middle finger	5	0	5
Ulnar palmar digital of middle finger	4	0	4
Radial palmar digital of ring finger	2	0	2
Musculocutaneous	5	25	29
Radial (upper arm with loss of triceps)	5	42	45
Radial (elbow with sparing of triceps)	5	35	38
Subscapulars (upper and lower)	0	5	5
Suprascapular	5	16	20
Thoracodorsal	0	10	10
Ulnar (above midforearm)	7	46	50
Ulnar (below midforearm)	7	35	40
Ulnar palmar digital of ring finger	2	0	2
Radial palmar digital of little finger	2	0	2
Ulnar palmar digital of little finger	3	0	3

Entrapment Neuropathy

T. 16, P. 57

- Alternative method for rating entrapment neuropathy

- **No definitions of mild, moderate, or severe**

- Can be problematic given lack of criteria for selecting the severity degree category

- If used, explain your reason for selecting the severity degree category

SHOW YOUR WORK!

RSD/CRPS

- Rate ROM loss
  (must be maximal and reproducible/consistent)
- Rate the sensory deficit/pain from T. 11, P. 48
- Rate the motor deficit of the injured peripheral nerve, if it applies (i.e. CRPS II), from T. 12, P. 49
- Combine sensory deficit/pain and motor deficit
- Combine ROM with value from sensory deficit/pain and motor deficit

Carpal Tunnel Syndrome

- Carpal tunnel syndrome and other major peripheral nerve disorders should be evaluated by sensory and motor nerve loss.

  - Don't use ROM

  - **Best Practice** don't use T. 16, P. 57 - no definitions of mild, moderate, or

Upper Extremity Case 5 MMI/IR CTS

History of the Injury

A 25 year old right handed male meatpacking worker presents to the family physician, who is also providing workers compensation care for the local company, with a 2 month duration of slow progressive onset of numbness and tingling of the right thumb, index finger, and middle fingers.

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Upper Extremity Case 5 MMI/IR CTS

Treatment History

- The patient has been a meatpacking worker for 5 years.

- His most recent job is with a whizzard knife cutting shoulder flanks of pork product. This involves a line speed of 780 per hour.

- He is right handed, using the whizzard knife with the right hand and a hook with the left hand.

Upper Extremity Case 5 MMI/IR CTS

Medical History

- 10 year history of diabetes mellitus (takes oral medicine, not insulin)

- Family practitioner exam:

- Positive Tinel's and Phalen's test on right

- No thenar muscle wasting

- Night time wakening with hand/finger numbness

Upper Extremity Case 5 MMI/IR CTS

Medical History

- Diagnosis of right CTS

- Family practitioner recommends:
    - Nighttime wrist splint
    - Ibuprofen
    - Occupational therapy for 3x per week for 2 weeks
    - Alternate duty (no knife or hook work)
    - Off work status for 2 weeks

Upper Extremity Case 5 MMI/IR CTS

Medical History

- The worker returns after 2 weeks with no improvement.

- Family practitioner treatment:
  - Injection of the carpal tunnel
  - OT referral
  - Continued use of splint
  - Being completely off work for 4 more weeks

Upper Extremity Case 5 MMI/IR CTS

Medical History

- The worker returns 4 weeks later
  (6 weeks post injury) with no change.
- Family practice doctor refers to hand surgeon for consultation regarding release surgery.
- Hand surgeon recommends endoscopic carpal tunnel release.
- Injured worker declines surgery

Upper Extremity Case 5 MMI/IR CTS

The insurance carrier adjuster requested a designated doctor examination to determine MMI and IR.

The designated doctor examination is 12 weeks post injury

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Upper Extremity Case 5 MMI/IR CTS

Designated Doctor Medical History:

- He presents to the DD exam with c/o right hand/finger numbness and tingling worse at night.

- He has not been able to return to playing frisbee golf or work. (For ADLs to use for Grade see T. 11, P. 48) due to the loss of sensation.

- His surgeon recommended surgery, but he does not want to do this.

Upper Extremity Case 5 MMI/IR CTS

Designated Doctor Physical Examination:

- Examination of both hands indicated no thenar atrophy.
- He has full ROM of both wrists.
- No edema, changes in skin blood flow, and/or abnormal sudomotor activity in the right hand or forearm.

Upper Extremity Case 5 MMI/IR CTS

Designated Doctor Physical Examination:

- Good grip strength bilaterally at position 2 – right 110#, left 102#.

- Sensory exam shows decreased sensation to median nerve distribution of the palmar aspects of the radial and ulnar distributions of the right thumb, index, and middle fingers.

- Tinel's and Phalen's tests are positive on the right.

MMI/IR – Upper Extremity Case 5

Designated Doctor Physical Examination:

- Based on the medical records and your physical examination of the injured employee, what is the compensable injury for certifying MMI and IR?

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Upper Extremity Case 5 MMI/IR CTS

Question for the Designated Doctor:

On the MMI date, what is the whole person IR?

Show your work!

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7. On the Date of MMI, what is the whole person IR?

A. 60%

B. 36%

C. 22%

D. 13%

T. 11, P. 48

Sensory deficit which interferes with activity "use maximum value."

60% sensory deficit

Table 11. Determining Impairment of the Upper Extremity Due to Pain or Sensory Deficit Resulting from Peripheral Nerve Disorders.

a. Classification

Grade	Description of sensory deficit or pain	% Sensory deficit
1	No loss of sensibility, abnormal sensation, or pain	0
2	Decreased sensibility with or without abnormal sensation or pain, which is forgotten during activity	1 - 25
3	Decreased sensibility with or without abnormal sensation or pain, which interferes with activity	26 - 60
4	Decreased sensibility with or without abnormal sensation or pain, which may prevent activity, and/or minor causalgia	61 - 80
5	Decreased sensibility with abnormal sensations and severe pain, which prevents activity, and/or major causalgia	81 - 100

b. Procedure

1. Identify the area of involvement using the dermatome charts (Figs. 45 and 46, pp. 50 and 52).
2. Identify the nerve(s) that innervate the area(s) (Table 10, Figs. 45 through 47, pp. 47, 50, 52, and 53).
3. Grade the severity of the sensory deficit or pain according to the classification given above.
4. Find the maximum impairment of the upper extremity due to sensory deficit or pain for each structure involved: spinal nerves (Table 13, p. 51), brachial plexus (Table 14, p. 52), and major peripheral nerves (Table 15, p. 54).
5. Multiply the severity of the sensory deficit by the maximum impairment value to obtain the upper extremity impairment for each structure involved.

T. 15, p. 54

Decreased sensation to median nerve distribution of the palmar aspects of the radial and ulnar distributions right thumb, index and middle fingers = 36% UE

| Nerve	Maximum % upper extremity impairment* — Due to sensory deficit or pain †
Pectorals (medial and lateral)	0
Axillary	5
Dorsal scapular	0
Long thoracic	0
Medial antebrachial cutaneous	5
Medial brachial cutaneous	5
Median (above midforearm)	38
Median (anterior interosseous branch)	0
Median (below midforearm)	38
Radial palmar digital of thumb	7
Ulnar palmar digital of thumb	11
Radial palmar digital of index finger	5
Ulnar palmar digital of index finger	4
Radial palmar digital of middle finger	5
Ulnar palmar digital of middle finger	4
Radial palmar digital of ring finger	2

T. 3, P. 20

UE IR =

60% x 36% UE

= 22% UE

22% UE converts to 13% WP

Table 3. Relationship of Impairment of the Upper Extremity to Impairment of the Whole Person.

% Impairment of		% Impairment of		% Impairment of	
Upper extremity	Whole person	Upper extremity	Whole person	Upper extremity	Whole person
0 =	0	35 =	21	70 =	42
1 =	1	36 =	22	71 =	43
2 =	1	37 =	22	72 =	43
3 =	2	38 =	23	73 =	44
4 =	2	39 =	23	74 =	44
5 =	3	40 =	24	75 =	45
6 =	4	41 =	25	76 =	46
7 =	4	42 =	25	77 =	46
8 =	5	43 =	26	78 =	47
9 =	5	44 =	26	79 =	47
10 =	6	45 =	27	80 =	48
11 =	7	46 =	28	81 =	49
12 =	7	47 =	28	82 =	49
13 =	8	48 =	29	83 =	50
14 =	8	49 =	29	84 =	50
15 =	9	50 =	30	85 =	51
16 =	10	51 =	31	86 =	52
17 =	10	52 =	31	87 =	52
18 =	11	53 =	32	88 =	53
19 =	11	54 =	32	89 =	53
20 =	12	55 =	33	90 =	54
21 =	12	56 =	34	91 =	55
22 =	13	57 =	34	92 =	55
23 =	14	58 =	35	93 =	56
24 =	14	59 =	35	94 =	56
25 =	15	60 =	36	95 =	57
26 =	16	61 =	37	96 =	58
27 =	16	62 =	37	97 =	58
28 =	17	63 =	38	98 =	59
29 =	17	64 =	38	99 =	59
30 =	18	65 =	39	100 =	60
31 =	19	66 =	40		
32 =	19	67 =	40		
33 =	20	68 =	41		
34 =	20	69 =	41		

Any Questions about Peripheral Nerve Injuries?
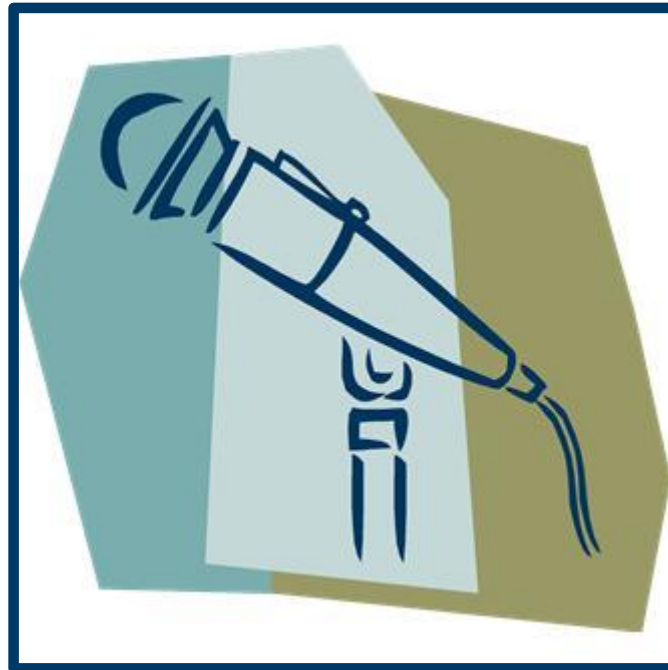
Hand and Upper Extremity Methods for Evaluating Impairment

- Amputation
- Sensory loss of digits
- ROM
- Peripheral nerve disorders
  - Cervical Spinal Nerve Roots
  - Brachial Plexus
  - Major Peripheral Nerves
- **Vascular Disorders**
- "Other Disorders"

Vascular Disorders

- Section 3.1 L

- Use T. 17, P. 57

- Difficult to find exact situation with every patient

- Combine vascular rating with amputation when amputation is due to peripheral vascular disease, T. 17, P. 57

Table 17. Impairment of Upper Extremity Due to Peripheral Vascular Disease

| Symptoms | Upper Extremity Impairment % | | | | |
	Class 1 (0%-9%)	Class 2 (10%-39%)	Class 3 (40%-69%)	Class 4 (70%-89%)	Class 5 (90%-100%)
Claudication	None	Intermittent with severe use	Intermittent with moderate use	Intermittent with mild use	
Pain at rest	None	None	None	Intermittent	Severe and constant
Edema	Transient	Persistent and moderate	Marked	Marked	Marked
Elastic support control		Incomplete	Partial	None	None
Signs of vascular damage	Loss of pulses; minimal loss of subcutaneous tissue of fingertips; arterial calcifications on roentgenogram; asymptomatic dilation of veins or arteries not requiring surgery; no decreased activity	Healed painless amputation stump of one digit with persistent vascular disease or healed ulcer	Healed amputation stump of two or more digits with persistent vascular disease or superficial ulceration	Amputation of two or more digits of each extremity, or amputation at or above wrist of one extremity, with persistent widespread or deep ulceration of one extremity	Amputation of all digits or amputation at or above the wrist of each extremity, with persistent vascular disease or widespread or deep ulcerations of both extremities
Raynaud's phenomenon	At less than 0°C (32°F)	At less than 4°C (39°F)	At less than 10°C (50°F)	At less than 15°C (59°F)	At less than 20°C (68°F)
Medication control	Good	Good	Partial	Partial	Poor

T. 17, P. 57

- Impairment of Upper Extremity Due to Peripheral Vascular Disease

Table 17. Impairment of Upper Extremity Due to P

Symptoms	Upper Extremity Impairment %	
	Class 1 (0%-9%)	Class 2 (10%-39%)
Claudication	None	Intermittent with severe use
Pain at rest	None	None
Edema	Transient	Persistent and moderate
Elastic support control		Incomplete
Signs of vascular damage	Loss of pulses; minimal loss of subcutaneous tissue of fingertips; arterial calcifications on roentgenogram; asymptomatic dilation of veins or arteries not requiring surgery; no decreased activity	Healed painless amputation stump of one digit with persistent vascular disease or healed ulcer
Raynaud's phenomenon	At less than 0°C (32°F)	At less than 4°C (39°F)
Medication control	Good	Good

Hand and Upper Extremity Methods for Evaluating Impairment

- Amputation

- Sensory loss of digits

- ROM

- Peripheral nerve disorders
  - Cervical Spinal Nerve Roots
  - Brachial Plexus
  - Major Peripheral Nerves

- Vascular Disorders

- **"Other Disorders"**

UPPER EXTREMITY Other Disorders

Section 3.1m (p. 58)

Impairments are under two different classes of disorders:

I. Bone And Joint Deformities, p. 58

II. Musculotendinous Impairments, p. 63

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Impairment Due to Other Disorders of the Upper Extremity

I. **Bone & Joint Deformities**

    A.   Joint Crepitation with Motion

    B.   Joint Swelling due to synovial hypertrophy

    C.   Digit Lateral Deviation

    D.   Digit rotational deformity

Impairment Due to Other Disorders of the Upper Extremity

I. Bone & Joint Deformities continued…

E. Persistent joint subluxation or dislocation

F. Joint instability

G. Wrist and elbow joint radial and ulnar deviation

H. Carpal instability

I. Arthroplasty

Impairment Due to Other Disorders of the Upper Extremity

II. Musculotendinous Impairments

   A. Intrinsic Tightness

   B. Constrictive Tenosynovitis

   C. Extensor Tendon Subluxation

Upper Extremity Other Disorders

- *"It is emphasized that impairments from the disorders considered in the section are usually estimated by using other criteria. The criteria described in this section should be used only when the other criteria have not adequately encompassed the extent of the impairments."* Section 3.1m, p. 58 AMA Guides, 4th Edition

- Address your consideration of this in your report.

APD 151158-s

- "The language contained on page 3/58 is ambiguous, whereas the language on page 3/62 provides more clear instruction regarding the rating of arthroplasty procedures. Therefore, we hold that impairment for a distal clavicle resection arthroplasty that was received as treatment for the compensable injury results in 10% UE impairment under Table 27, which is then combined with ROM impairment, if any, as provided by the AMA Guides."

Upper Extremity Other Disorders

- Some disorders may be combined with range of motion impairments and some may not be combined.

Upper Extremity Other Disorders

Tables are different and have:

- Joint impairments

- Digit impairments

- Upper

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Upper Extremity Other Disorders

- Usually range of motion is the best determination of impairment

- Have to be cautious in using different tables and values

- "The criteria described in this section should be used only when other criteria have not adequately encompassed the extent of the impairments,"P. 58.

- **SHOW YOUR WORK!**

T. 27, P. 61

Table 27. Impairment of the Upper Extremity After Arthroplasty of Specific Bones or Joints.

Level of arthroplasty*	% Impairment of upper extremity	
	Resection arthroplasty (40%)	Implant arthroplasty (50%)
Total shoulder	24	30
Distal clavicle (isolated)	10	—
Total elbow	28	35
Radial head (isolated)	8	10
Total wrist	24	30
Ulnar head (isolated)	8	10
Proximal carpal row	12	15
Carpal bones	12	15
Thumb†		
Carpometarcarpal	11	13
Metacarpophalangeal	1	2
Interphalangeal	2	3
Index or middle finger‡		
Metacarpophalangeal	7	9
Proximal interphalangeal	6	7
Distal interphalangeal	3	4
Ring or little fingers‡		
Metacarpophalangeal	3	4
Proximal interphalangeal	3	3
Distal interphalangeal	2	2

*If more than one level is involved, *combine* the levels from distal to proximal.

†If more than one thumb joint is involved, *add* the impairments.

‡If more than one joint is involved in the same finger, *combine* impairments. If multiple digits are involved, *add* the digit impairments.

Upper Extremity – Grip Strength

3.1 m (P. 64-65) - Strength Evaluation

- Rarely used, subject to patient effort

- If used, describe why this was the "rare case"(p. 64),

- Must determine maximal, valid effort – document findings in your report (3 measurements <20% CV; 5 position grip; REG)

- Do not double rate with strength loss from nerve injury

- Use Tables and formulas on PP. 64 and 65 to determine

Upper Extremity - Grip Strength

Determine maximal, valid effort

- Use measurements taken at intervals during exam, three times each hand.

- Must be less than 20% variation (CV) to be considered maximal, valid effort

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Upper Extremity – Grip Strength

Determine maximal, valid effort

- 5 position grip producing bell-shaped curve

- Rapid exchange grip test

Extremity Case 6 MMI/IR
RCR with distal clavicle resection

History of Injury

A 25 year old teacher slipped and fell into the wall with his arm to his right side, contacting his dominant right shoulder 16 months ago.

Upper Extremity Case 6 MMI/IR RCR with distal clavicle resection

Treatment History

- He initially saw an occupational medicine physician and was found to have significant tenderness over the right AC joint and reduced right shoulder ROM.
- Right shoulder X-rays revealed a Type III acromion but no fracture or dislocation.
- Initial treatment included the use of a sling and NSAIDs, followed by 12 visits of physical therapy, with some improvement.
- He was able to return to work with restrictions.

Upper Extremity Case 6 MMI/IR RCR with distal clavicle resection

Treatment History

- His symptoms persisted and a right shoulder MRI scan was obtained 2 months post injury, revealing a partial thickness tear of the supraspinatus tendon, increased signal in the subacromial bursa, type III acromion, and degenerative changes of the AC joint.

- Orthopedic surgical consultation was obtained, where arthroscopic acromioplasty with distal clavicle resection and rotator cuff repair were performed.

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Upper Extremity Case 6 MMI/IR RCR with distal clavicle resection

Treatment History

- He completed a course of post-operative PT, consisting of 30 visits over 6 months.

- He returned to work full time as a teacher while in PT.

Upper Extremity Case 6 MMI/IR RCR with distal clavicle resection

Designated Doctor Medical History

- He is working full time as a teacher with restrictions to avoid lifting overhead with
  right arm.
- Reports he has not been able to
  successfully complete yoga class.
- His QuickDASH score is 50.

Upper Extremity Case 6 MMI/IR RCR with distal clavicle resection

Designated Doctor Physical examination:

- Active and resisted left shoulder ROM is full and pain- free.

- He has 5/5 strength of bilateral upper extremities with the exception of right shoulder flexion, abduction, and external rotation, which were 4/5 due to pain.

- Resisted "empty can," Hawkin's and Neer's are positive for increased pain and weakness.

- Upper extremity sensation and DTRs are normal. There is no atrophy and upper extremity pulses are normal.

Upper Extremity Case 6 MMI/IR RCR with distal clavicle resection

- **Designated Doctor Physical Examination**

- Active goniometric right shoulder ROM:
  - flexion 160°
  - extension 40°
  - abduction 120°
  - adduction 30°
  - internal rotation 30°
  - external rotation 30°

- All with complaints of increased right shoulder pain.

- Passive shoulder motions are greater than active motion and less painful.

Upper Extremity Case 6 MMI/IR
RCR with distal clavicle resection

Question for the Designated Doctor:

On the MMI date, what is the whole person IR?

Show your work!

8. On the Date of MMI, what is the whole person IR?

A. 20%

B. 12%

C. 11%

D. 4%

Extremity Case 6 MMI/IR
RCR with distal clavicle resection

Shoulder ROM

- flexion 160° = 1% UE
- extension 40° = 1% UE
- abduction 120° = 3% UE
- adduction 30° = 1% UE
- internal rotation 30° = 4% UE
- external rotation 30° = 1% UE

Total = 11% UE

Extremity Case 6 MMI/IR
RCR with distal clavicle resection

- 11% UE for ROM

- 10% UE for distal clavicle resection (T. 27, P. 61)

- 11% cw 10% = 20% UE

- 20% UE converts

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Distal Clavicle Resection Arthroplasty

- By definition, requires resection of the distal clavicular portion of the AC joint (not the same as acromioplasty)

- Carefully review and cite relevant portions of the operative report

- Can combine with ROM -

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Any Questions about Other Disorders?

Hand and Upper Extremity Pearls (see Summary p. 66)

- Use **Figure 1** and submit it with DWC Form-069 and your narrative report.

- **Add** thumb ROM values, **combine** ROM values for *other digits*

- **Combine** individual digit impairments, then convert to **hand**

- **Add** the hand impairment values for *multiple digits*

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Hand and Upper Extremity Pearls (see Summary p. 66)

- Convert hand to UE, combine with other UE impairments.

- Convert to whole person impairment.

- Combine with whole person impairments from other regions.

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Hand and Upper Extremity Pearls

Multiple Upper Extremities

- Determine whole person impairment from each upper extremity.

- Combine whole person impairment from each upper extremity to give total whole person impairment.

  - Appeals Panel Decision 061569-s

Hand and Upper Extremity Pearls

- Round UE ROM to nearest 10° vs. wrist radial/ulnar deviation Fig 29, p. 38 in 5° increments.

- Carpal tunnel syndrome and other nerve disorders should be evaluated by sensory and motor nerve loss (not ROM; entrapment neuropathy T. 16, P. 57 not recommended – no definitions of mild, moderate, or severe).

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Hand and Upper Extremity Pearls

**Grip Strength loss for rare cases only,
not recommended, must document validity criteria (with measurements)**

- 3 measurements with < 20% CV, each hand

- 5 position grip

- Rapid exchange grip

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Questions?

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