Chapter 2. Part 2. Assessment Techniques

Chapter 2 • Basic Concepts in Physiotherapy

Part 2 • Assessment Techniques

(Physical-examination procedures • Tools: goniometer, dynamometer, & more)

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1 Why a Structured Assessment Matters

A physiotherapy diagnosis is built on **objective data**—not guesses. A reproducible exam:

1. **Guides intervention choice** (e.g., mobilise vs stabilise).
2. **Sets baselines** for progress tracking.
3. **Meets legal/ethical standards** for documentation and informed consent.

Rule: *Collect the right data, the same way, every time.* Reliability = confidence.

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2 Core Physical-Examination Sequence (SOAP "O")

Step	Goal	Key Actions & Tips	Common Errors
Observation / Inspection	Detect gross deviations	Posture, gait, swelling, colour, facial cues	Letting patient "perform" before baseline posture noted
Palpation	Localise tenderness, temperature, tone	Use systematic superficial → deep sweep; compare bilaterally	Thumb-tip pressure too high → false positives
Active Range of Motion (AROM)	Assess willingness & control	Instruct plane, demo once, then observe	Assisting patient subconsciously
Passive Range of Motion (PROM)	Detect end-feel, capsular pattern	Stabilise proximal segment; move distal slowly	Over-pressure too abrupt → guarding
Muscle-Strength Testing	Grade force	Manual Muscle Test (MMT) 0–5 **or** handheld dynamometer (HHD)	Grading 4 vs 5 without comparing to contralateral
Neurological Screen	Rule out neural deficit	Dermatomes, myotomes, DTRs, UMN signs	Testing only pain, forgetting light-touch
Special Tests	Confirm hypothesis	Lachman, Slump, Adson, etc.	Doing many low-specificity tests "just in case"
Functional Tasks	Link to ADLs	Sit-to-stand, stair, hop, pick-up test	Ignoring patient's own priority activity

Document each step immediately in SOAP or ICF format; note pain (0–10) & quality (sharp, dull).

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3 Key Measurement Tools

3.1 Goniometers & Inclinometers

Feature	Standard Plastic Goniometer	Bubble / Digital Inclinometer
Use	Joint ROM in single plane	Spine ROM, complex planes

Feature	Standard Plastic Goniometer	Bubble / Digital Inclinometer
Procedure	Align fulcrum at joint axis; stationary & moving arms on landmarks; read at eye-level	Zero device; attach via strap or place on segment; read digital or bubble
Normative Example	Shoulder ER 90° (90/90)	Thoracolumbar flex 0-90°
Reliability Tips	Same examiner, same landmarks, 2 trials avg.	Calibrate each session; avoid tilting device

3.2 Handheld & Isokinetic Dynamometers

Parameter	Handheld Dynamometer (HHD)	Isokinetic Dynamometer
Measures	Peak isometric force (N or kgf)	Torque across ROM at set speed (°/s)
Pros	Portable, inexpensive, >0.90 ICC with practice	Gold standard, measures concentric/eccentric work & power
Cons	Tester strength bias, stabilisation critical	Bulky, costly, learning curve
Best For	Routine clinic strength auditing, post-op comparison	Research, return-to-sport decision, muscle imbalance profile
Key Technique	3-5 s break-test; average best 2/3 trials; same lever-arm length	Warm-up, gravity correction, 60–180 °/s speeds, compare bilateral ratios

3.3 Supplementary Tools

Tool	Measures	Typical Use Case	Note
Tape Measure / Anthropometer	Circumference, limb length	Swelling (knee effusion), muscle girth, LLD	Mark landmarks with skin pen
Pressure Algometer	Pain-pressure threshold (kg/cm²)	Myofascial pain, central sensitisation research	Gradual 1 kg/s pressure rate
Surface EMG	Muscle activation timing & amplitude	Biofeedback for post-stroke gait, ergonomic studies	Skin prep—shave, abrade, alcohol
Force Plate / Pressure Mat	GRF, COP, balance metrics	Postural sway, jump analysis	Zero plate; barefoot vs shod consistency
Spirometer / Peak-Flow Meter	VC, FEV_1, PEFR	Pulmonary rehab baseline	Nose-clip, repeat best of 3
Functional Scales	WOMAC, DASH, Berg, TUG	Patient-reported + performance outcomes	Translate to local language validated versions

4 Standardised Testing Batteries (Examples)

Region / Condition	Battery Components	Reference Value to Trigger Intervention
Knee OA	Pain VAS, AROM goniometry, HHD quad strength, 30-s Sit-to-Stand	Quad strength < 1.5 Nm/kg → start progressive resistance
Stroke (Sub-acute)	Fugl-Meyer, 10-m walk, sEMG symmetry, Modified Ashworth	MAS > 2 + synergy EMG → consider botulinum plus task training
Low Back Pain	Inclinometer lumbar ROM, Prone-plank, Biering-Sorensen, Oswestry Index	Sorensen hold < 60 s → add lumbar endurance protocol

5 Quality Control & Error Reduction

1. **Calibration log**—goniometers checked vs digital, dynamometers zeroed daily.
2. **Inter-tester reliability**—pair up & compare 10 patients monthly (±5° ROM, ±10 % force).
3. **Blinding**—when re-testing, conceal previous score to avoid bias.
4. **Environmental constants**—same table height, chair, shoe/no-shoe, time-of-day (strength peaks 3 pm).
5. **Patient factors**—pain meds, fatigue, motivation; note deviations.

6 Documentation Essentials (SOAP “O” Example)

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R shoulder ER: 68° AROM, firm capsular end-feel; pain 4/10 at 50° → goal 85° in 4 wks
Quad strength (HHD): 22.5 kgf @ 60° knee flex; 15 % ↓ contra side → add isolated open-chain 3×8 @ 70 % MVIC
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7 Clinical Decision Tree (Simplified)

1. **Identify impairment** → ROM < norm or strength deficit >10 %.
2. **Cross-check function** → Does deficit limit ADL/sport?
3. **Select targeted test** → Special test or EMG to confirm mechanism.
4. **Plan** → Mobilisation if capsular; strengthen if myogenic; neuro re-ed if timing deficit.
5. **Re-test** → Same tool, same conditions next session/week.

8 Mini-Quiz (Self-Check)

1. *Why is a “make” test generally preferred over a “break” test when using a handheld dynamometer for post-op rotator cuff?*
2. *Name two reasons a goniometric hip-extension reading might be falsely low.*
3. *Which parameter from an isokinetic knee test best predicts return-to-sport readiness: peak torque, total work, or hamstring:quadriceps ratio—and why?*
4. *What is the minimal detectable change (MDC) vs minimal clinically important difference (MCID), and why should you record both?*

(Answers at the end of your lecture hand-out!)

Take-Home Messages

- **Reliability first, fancy gadgets later**—master palpation and positioning before buying tech.
- **Tool ≠ Diagnosis**—integrate mechanical data with patient-reported outcomes and functional tasks.
- **Re-test rules**—only change the plan when a change exceeds MDC/MCID.