

FIGURE 9-13. Correct posture with a lumbar roll. **A.** Sitting roll. In sitting, the lumbar roll should support but not exaggerate the lumbar lordosis. **B.** Night roll. Patients who find side lying worsens symptoms are often more comfortable with a rolled towel fastened around the waist to support the spine in neutral.

levels of satisfaction in their ability to manage their current symptoms and recurrences,³⁸ demonstrate lower rates of recurrence,^{39,40} have less sick leave,⁴¹ and seek less medical assistance.⁴¹

Intervention for Derangement Syndrome

Reduction of a derangement is achieved and maintained by consistent application of the loading strategy that centralized the patient's symptoms during the examination. Once reduced, it is important to educate the patient to consistently avoid the provocative positions and movements. Extensive patient education regarding centralization and peripheralization principles as well as postural education and correction are vital to maintaining reduction and preventing recurrence.

Ideally, exercises must be performed 10 times every 1 to 2 waking hours, or more frequently if symptoms recur. Assuming the mechanical classification given at examination is correct, patients should report a decrease in symptoms with



FIGURE 9-14. Progression of forces. Forces are progressed when symptoms have decreased but have reached a plateau. **A.** The force progression for extension in lying is as seen in **a**. **B.** Extension in lying with self-overpressure.

centralization, increased mobility, and tolerance for progression of forces. If centralization is not achieved within five sessions, it is unlikely that centralization will occur.¹⁷ A common error is that patients may not have achieved end range and then are mistakenly believed to be noncentralizers.

When the patient's symptoms are no longer provoked or peripheralized with movements or postures, the derangement is considered to be fully reduced. During intervention, provocative motions are avoided to reduce the risk of rederangement. A return to provocative motions must be done gradually, with the goal of restoring any residual motion loss and with an awareness that any limitation in spinal motion is a risk factor for future derangement.² Intervention is complete when the patient reports restoration of normal activities and pain-free movement in all directions.

Empowering patients to intelligently manage their own pain by providing them with the tools needed to recognize and manage recurrences is one of the greatest virtues of the MDT approach. When warning signs are present, patients should initiate self-management measures for 48 hours, such as (1) avoiding positions and movements that provoke pain, (2) sitting with the lumbar spine unsupported for no longer than 5 to 10 minutes at a time and resting in either the prone or supine position, and (3) commencing with prior exercise 10 to 15 times every 1 to 2 waking hours. Patients are



FIGURE 12-3 The elbow flexion test (EFT)

the patient responds with primary initiation of the trunk core muscles supplemented by global muscles to produce an appropriate balance and strength response. For a more detailed description of the EFT, see Chapter 13.^{5,22}

Lumbar Protective Mechanism Test

In 1983, Johnson developed the term **lumbar protective mechanism (LPM)** to refer to the trunk’s ability to automatically stabilize against external force in the efficient state. To perform this test, the patient is positioned against a stable surface with the trunk unsupported or in a stride stance. A slow and progressive force is applied to the shoulders in anterior-posterior and posterior-anterior diagonal directions to reveal the patient’s stabilizing response (Fig. 12-4). For a more detailed description of the LPM, see Chapter 13.^{5,22}

Functional Squat Test

The **functional squat (FS) test** is an excellent method to examine common functional movement patterns that involve the entire body. The patient stands with a normal base of support and squats as far as possible without pain while keeping the



FIGURE 12-4 The lumbar protective mechanism (LPM).

heels on the ground. During the squat, the patient’s balance and sequence of motion are noted (Fig. 12-5). This test is progressed to the step and step-down test. For a more detailed description of the functional squat test, see Chapter 13.^{2,3,5}

Functional Palpation Examination

Skilled **functional palpation** should identify the exact condition of the underlying joint, soft tissue, nerve, and organ during normal motions. Functional palpation uses passive, active, and resisted PNF patterns and normal functional motions to effectively examine the quantity and quality of the three-dimensional motions of joints and soft tissues. Based on function, these tissues are examined during various postures and movements (Figs. 12-6, 12-7, 12-8).^{1-5,16-18,21} The quality of end-feel, accessory motion, and tissue extensibility are the *pillars* of the functional palpation examination.

QUESTIONS for REFLECTION

- Functional palpation uses which motions during examination?
- What are considered to be the pillars of functional palpation?
- What are the three dimensions in which end-feel should be assessed?
- Define “muscle play” and how this might be used to determine the presence of soft tissue restrictions.

End-Feel

End-feel is defined as “the quality of resistance felt in a tissue or joint at the end of physiologic or accessory range.”¹⁻⁵ A springy end-feel is indicative of the efficient state. Dysfunctional tissues have varying degrees of hard end-feel and motion loss. The goal is to assess end-feel and localize restrictions in three dimensions (*location, direction, and depth*).



FIGURE 12-5 Observation of balance and the sequence of motion during the functional squat (FS) test.



FIGURE 12-6 Functional palpation examination of the shoulder to assess end-feel, accessory motion, and tissue extensibility.



FIGURE 12-7 Functional palpation examination of the hip to assess end-feel, accessory motion, and tissue extensibility.

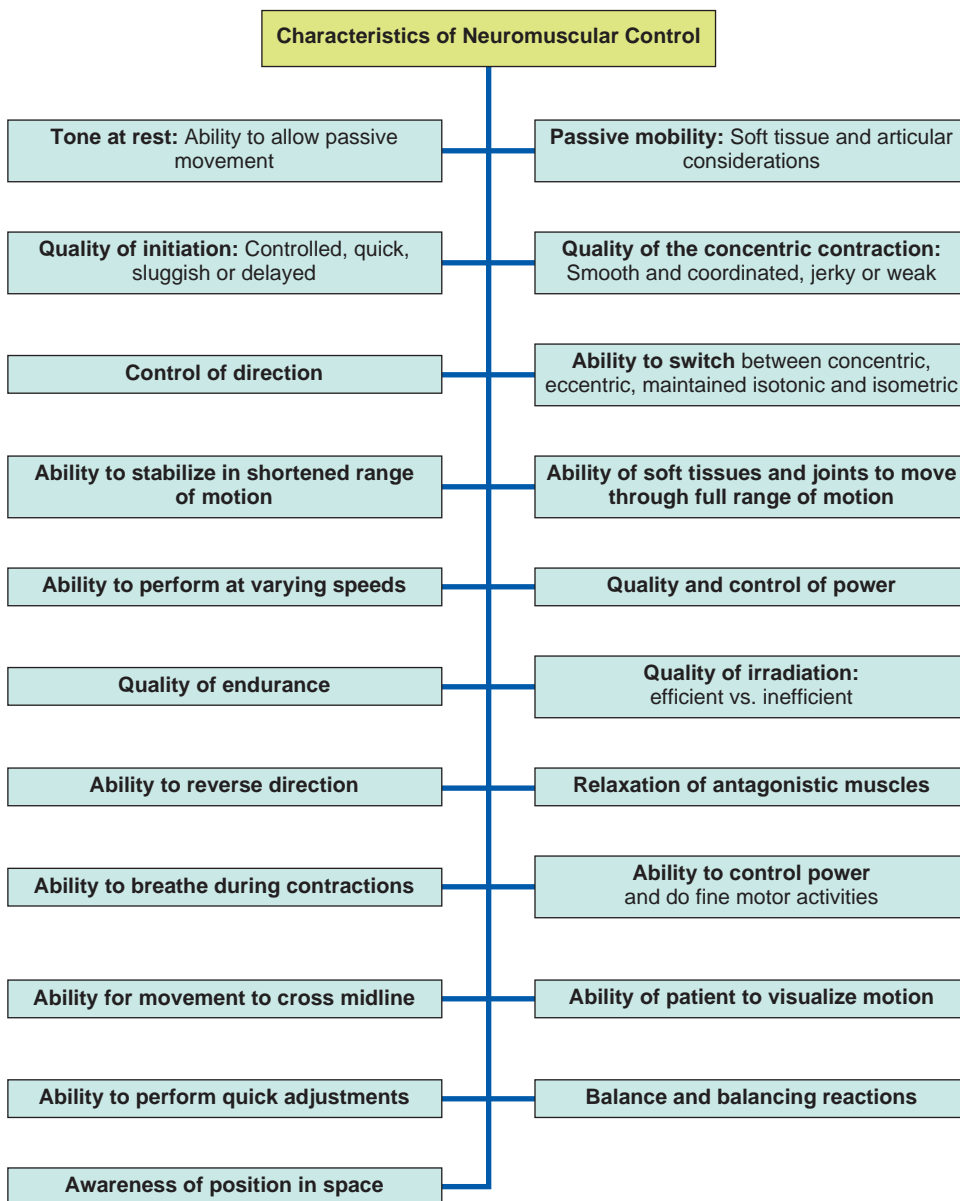


FIGURE 12-8 Characteristics of neuromuscular control.

Accessory Motion

Accessory motion is a term generally used in reference to joint mobility. Mennell²³ adopted the term *joint play* to describe accessory joint motion. Unique to the FM approach is the consideration of the motion that normally occurs between all soft tissue structures. The interfaces between soft tissue structures are separated by fascia (extracellular matrix), and lubricated by the ground substance, and may be termed **functional joints**.²⁴ In the FM approach, motion occurring between muscles is termed **muscle play**, which highlights the ability of muscles to move freely in relationship to each other.^{1,5} Refer to Chapter 13 for a complete discussion.^{2,3,5}

CLINICAL PILLAR

Assessment of soft tissues, such as joints, should include the following:

- Examination using both active and passive motion
- Examination using three-dimensional motions
- Examination using both WB and NWB postures
- Examination using end-feel in three dimensions
- Examination of accessory motion

Tissue Extensibility

Tissue extensibility is defined as the ability of tissues to optimally elongate and fold (shorten) while maintaining a springy end-feel.^{1,5} Evaluation of true soft tissue extensibility and flexibility is achieved by palpating the tissues through their full passive, active, and resisted ranges of motion.

Neurovascular Mobility and Neural Dynamic Examination and Intervention

Patients with chronic pain often exhibit underlying dysfunction within the peripheral and central nervous systems.²⁵⁻³¹ The FM strategy for neurovascular examination and intervention expands upon the work of others (see Chapter 19). FM incorporates the use of specific **tracing and isolating procedures**, which use passive and active movement with functional palpation to assist in localizing the specific peripheral and central adhesions.

Upper Limb Tension Testing

The *upper limb tension tests (ULTT)*, developed by Elvey²⁷ provide the foundation for the FM neurovascular examination and intervention. FM uses active and resisted motions in addition to passive positioning to trace and isolate neurovascular restrictions. The patient is guided through motions to reproduce repeated slack and tension, as traditionally described, while the therapist palpates the nerve from the neural foramen to the hand. Often, several locations of impeded mobility are identified (i.e., double crush injury).²⁸ Once an adherence is identified, the therapist treats the localized restriction(s) with sustained pressure at the barrier,

coupled with mobilization through repeated upper extremity motion (Fig. 12-9).

The FM protocol proceeds from the periphery to evaluation of each associated cervical vertebra. In the case of a median nerve restriction, for example, it is critical to enhance the mobility of C5-T1. Next, the therapist places pressure at the lateral aspect of each cervical vertebra while performing the median nerve ULTT. Dysfunction is identified by (1) a change in end-feel, (2) increased pressure against the palpating finger, or (3) a positional change in the vertebra. Dysfunction is treated by blocking the vertebra while tension is produced through upper extremity motion until the vertebra no longer moves in response to neural tensile forces (Fig. 12-10).³

QUESTIONS for REFLECTION

What is unique about the manner in which *upper and lower limb tension tests* for the examination of neural mobility are performed within the **FM approach** to OMPT compared with typical methods as described in Chapter 19?



FIGURE 12-9 During upper limb tension testing, once an adherence is identified, the therapist treats the localized restriction(s) with sustained pressure at the barrier, coupled with mobilization through repeated upper extremity motions.



FIGURE 12-10 Blocking the involved vertebra while intermittent tension is produced from passive, active, or resisted upper extremity motion.