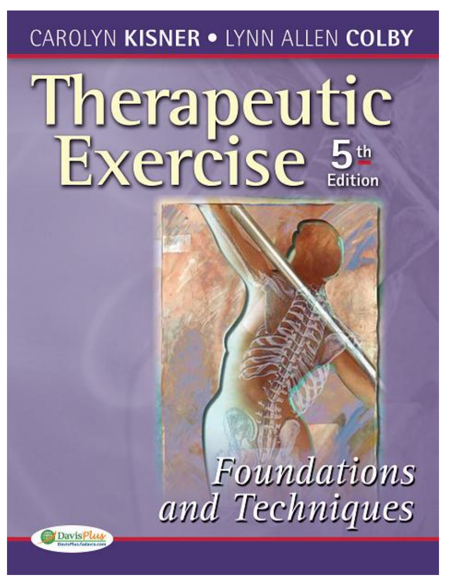
Biên soạn PĐĐT 2014

Phân biệt bài tập kéo dãn và bài tập theo TVĐ
(stretching exercise and ROM exercise)



Hồ Quang Hưng

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Câu hỏi từ bài trình nhóm 2

- Một BN gãy đầu dưới xương quay, vào tuần thứ 8, duỗi cổ tay bị hạn chế. Để tăng ROM, chuyên viên VLTL sử dụng kĩ thuật sau: nói bệnh nhân duỗi cổ tay tối đa, CVVTL hỗ trợ thêm để tăng thêm độ duỗi.
- Câu hỏi chính: kĩ thuật này được xếp vào nhóm bài tập kéo dãn (stretching) hay bài tập chủ động có trợ giúp (AAROM)?
- Câu hỏi phụ 1: AAROM có giúp tăng ROM?
- Câu hỏi phụ 2: kéo dãn có bị chống chỉ định sau gãy xương không?

Chapter 3: Range of motion

Types of ROM Exercises

- **Passive ROM.** Passive ROM (PROM) is movement of a segment within the unrestricted ROM that is produced entirely by an *external force*; there is little to or no voluntary muscle contraction. The external force may be from gravity, a machine, another individual, or another part of the individual's own body.[8] PROM and passive stretching are not synonymous (see Chapter 4 for definitions and descriptions of passive stretching).
- **Active ROM.** Active ROM (AROM) is movement of a segment within the unrestricted ROM that is produced by active contraction of the *muscles* crossing that joint.
- **Active-Assistive ROM.** Active-assistive ROM (A-AROM) is a type of AROM in which assistance is provided manually or mechanically by an outside force because the prime mover muscles need assistance to complete the motion.

Các loại bài tập trong TVĐ

- PROM: cử động trong TVĐ không bị giới hạn, sinh ra hoàn toàn bởi ngoại lực, có rất ít hoặc không có sự co cơ. Ngoại lực lực này có thể là trọng lượng, máy, người khác hay phần khác cơ thể
- AROM: có co cơ
- AAROM: cơ chủ vận cần hỗ trợ để hoàn tất TVĐ

Active and Active-Assistive ROM

Indications for AROM

- Whenever a patient is able to contract the muscles actively and move a segment with or without assistance, AROM is used.
- When a patient has weak musculature and is unable to move a joint through the desired range (usually against gravity), A-AROM is used to provide enough assistance to the muscles in a carefully controlled manner so the muscle can function at its maximum level and be progressively strengthened. Once patients gain control of their ROM, they are progressed to manual or mechanical resistance exercises to improve muscle performance for a return to functional activities (see Chapter 6).
- AROM can be used for aerobic conditioning programs (see Chapter 7).

- When a segment of the body is immobilized for a period of time, AROM is used on the regions above and below the immobilized segment to maintain the areas in as normal a condition as possible and to prepare for new activities, such as walking with crutches.

Goals for AROM

If there is no inflammation or contraindication to active motion, the same goals of PROM can be met with AROM. In addition, there are physiological benefits that result from active muscle contraction and motor learning from voluntary muscle control. Specific goals are to:

- Maintain physiological elasticity and contractility of the participating muscles
- Provide sensory feedback from the contracting muscles
- Provide a stimulus for bone and joint tissue integrity
- Increase circulation and prevent thrombus formation
- Develop coordination and motor skills for functional activities

Mục tiêu của AROM:

- Duy trì đặc tính co dãn và co cơ
- Cung cấp PHSH
- Cung cấp vận động toàn vẹn cơ xương
- Tăng tuần hoàn, ngừa huyết khối
- Phát triển phối hợp và kĩ năng vận động

Chapter 4: Stretching for impaired mobility

The term *mobility* can be described based on two different but interrelated parameters. It is often defined as the ability of structures or segments of the body to move or be moved to allow the presence of range of motion for functional activities *(functional ROM)*.[1,134] It can also be defined as the ability of an individual to initiate, control, or sustain active movements of the body to perform simple to complex motor skills *(functional mobility)*.[38,118,134] Mobility, as it relates to functional ROM, is associated with joint integrity as well as the *flexibility* (i.e., *extensibility* of soft tissues that cross or surround joints—muscles, tendons, fascia, joint capsules, ligaments, nerves, blood vessels, skin), which are necessary for unrestricted, pain-free movements of the body during functional tasks of daily living. The ROM needed for the performance of functional activities does not necessarily mean full or "normal" ROM.

Just as strength and endurance exercises are essential interventions to improve impaired muscle performance or prevent injury, when restricted mobility adversely affects function and increases the risk of injury, stretching interventions become an integral component of the individualized rehabilitation program. Stretching exercises are also thought to be an important element of fitness and conditioning programs designed to promote wellness and reduce the risk of injury and reinjury. *Stretching* is a general term used to describe any therapeutic maneuver designed to *increase* the extensibility of soft tissues, thereby improving flexibility by elongating (lengthening) structures that have adaptively shortened and have become hypomobile over time.[7,71,154]

- Mobility: khả năng di chuyển những cấu trúc hay phần cơ thể để cho phép tồn tại tầm vận động (ROM)
- Strength and endurance ➔ muscle performance
- Stretching ➔ ROM

68 DEFINATION OF TERMS RELATED TO MOBILITY AND STRETCHING

BOX 4.1 Indications for Use of Stretching

- ROM is limited because soft tissues have lost their extensibility as the result of adhesions, contractures, and scar tissue formation, causing functional limitations or disabilities.
- Restricted motion may lead to structural deformities that are otherwise preventable.
- There is muscle weakness and shortening of opposing tissue.
- May be used as part of a total fitness program designed to prevent musculoskeletal injuries.
- May be used prior to and after vigorous exercise potentially to minimize postexercise muscle soreness.

tissues and the more likely it is that the contracture will become irreversible.[33,66,144]

Interventions to Increase Mobility of Soft Tissues

Many therapeutic interventions have been designed to improve the mobility of soft tissues and consequently increase ROM and flexibility. Stretching and mobilization are general terms that describe any therapeutic maneuver that increases the extensibility of restricted soft tissues. There are situations in which stretching interventions are approriate and safe; however, there are also instances when stretching should not be implemented. Boxes 4.1 and 4.2 list indications and contraindications for the use of stretching interventions.

The following are terms that describe a number of procedures designed to increase soft tissue and joint mobility, only some of which are addressed in depth in this chapter.

BOX 4.2 Contraindications to Stretching

- A bony block limits joint motion.
- There was a recent fracture, and bony union is incomplete.
- There is evidence of an acute inflammatory or infectious process (heat and swelling) or soft tissue healing could be disrupted in the tight tissues and surrounding region.
- There is sharp, acute pain with joint movement or muscle elongation.
- A hematoma or other indication of tissue trauma is observed.
- Hypermobility already exists.
- Shortened soft tissues provide necessary joint stability in lieu of normal structural stability or neuromuscular control.
- Shortened soft tissues enable a patient with paralysis or severe muscle weakness to perform specific functional skills otherwise not possible.

Manual or Mechanical/Passive or Assisted Stretching

A sustained or intermittent external, end-range stretch force, applied with overpressure and by manual contact or a mechanical device, elongates a shortened muscle-tendon unit and periarticular connective tissues by moving a restricted joint just past the available ROM. If the patient is as relaxed as possible, it is called *passive stretching*. If the patient assists in moving the joint through a greater range, it is called *assisted stretching*.

Self-Stretching

Any stretching exercise that is carried out independently by a patient after instruction and supervision by a therapist is referred to as *self-stretching*. The terms self-stretching and *flexibility exercises* are often used interchangeably. However, some practitioners prefer to limit the definition of flexibility exercises to ROM exercises that are part of a general conditioning and fitness program carried out by individuals without mobility impairment. *Active stretching* is another term sometimes used to denote self-stretching procedures. However, stretching exercises that incorporate inhibition or facilitation techniques into stretching maneuvers have also been referred to as active stretching.[158]

Neuromuscular Facilitation and Inhibition Techniques

Neuromuscular facilitation and inhibition procedures are purported to relax tension in shortened muscles reflexively prior to or during muscle elongation. Because the use of inhibition techniques to assist with muscle elongation is associated with an approach to exercise known as proprioceptive neuromuscular facilitation (PNF),[134,147] many clinicians and some authors refer to these combined inhibition/muscle lengthening procedures as *PNF stretching*,[19,71,110] active inhibition,[71] active stretching,[158] or facilitated stretching.[119] Stretching procedures based on principles of PNF are discussed in a later section of this chapter.

Muscle Energy Techniques

Muscle energy techniques are manipulative procedures that have evolved out of osteopathic medicine and are designed to lengthen muscle and fascia and to mobilize joints.[22,26,46,109,157] The procedures employ voluntary muscle contractions by the patient in a precisely controlled direction and intensity against a counterforce applied by the practitioner. Because principles of neuromuscular inhibition are incorporated into this approach, another term used to describe these techniques is *postisometric relaxation*.

Joint Mobilization/Manipulation

Joint mobilization/manipulation methods are manual therapy techniques specifically applied to joint structures and are used to stretch capsular restrictions or reposition a subluxed or dislocated joint.[82,104] Basic techniques for the extremity joints are described and illustrated in detail in Chapter 5. Mobilization with movement techniques for the extremities are described and illustrated throughout the regional chapters (see Chapters 17 to 22).

Interventions to increase mobility of soft tissues

- Manual or mechanical stretching
- Passive or assisted stretching
- Self-stretching
- Neuromuscular Facilitation and Inhibition Techniques

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- Nếu bệnh nhân càng thư giãn có thể thì gọi là kéo dãn thụ động
- Nếu bệnh nhân hỗ trợ trong việc di chuyển khớp trong TVĐ lớn hơn thì gọi là kéo dãn trợ giúp

Self-Stretching
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- Một vài nhà lâm sàng thích giới hạn định nghĩa “flexibility exercise” là “ROM exercise”, là một phần trong chương trình tập “conditioning and fitness program” thực hiện ở những người không có giới hạn “mobility” (ROM)

BOX 4.1 Indications for Use of Stretching

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- Shortened soft tissues enable a patient with paralysis or severe muscle weakness to perform specific functional skills otherwise not possible.

Chỉ định của kéo dãn

- TVĐ bị giới hạn gây giới hạn chức năng
- TVĐ giới hạn có thể gây ra biến dạng cấu trúc
- Yếu hay rút ngắn cơ đối diện
- Dùng như một phần chương trình tập sức khỏe
- Có thể dùng trước những bài tập mạnh bạo để giảm đau cơ

Chống chỉ định của kéo dãn

- Kẹt xương
- Gãy xương mới, liền xương không chắc chắn
- Viêm cấp, nhiễm trùng
- Đau chói
- Máu tụ
- TVĐ đã quá mức
- Mô rút ngắn đã cung cấp môt sự vững khớp cần thiết
- Mô rút ngắn giúp BN liệt hay yếu cơ thực hiện chức năng

Ví dụ trong sách minh họa cho câu hỏi của chúng ta

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- Supinate or pronate the forearm just beyond the point of tissue resistance.
- Be sure the stretch force is applied to the radius rotating around the ulna. Do not twist the hand, thereby avoiding stress to the wrist articulations.
- Repeat the procedure with the elbow extended. Be sure to stabilize the humerus to prevent internal or external rotation of the shoulder.

The Wrist and Hand: Special Considerations

The extrinsic muscles of the fingers cross the wrist joint and therefore may influence the ROM of the wrist. Wrist motion may also be influenced by the position of the elbow and forearm because the wrist flexors and extensors attach proximally on the epicondyles of the humerus.

When stretching the musculature of the wrist, the stretch force should be applied proximal to the metacarpophalangeal (MCP) joints, and the fingers should be relaxed.

Patient Position

When stretching the muscles of the wrist and hand, have the patient sit in a chair adjacent to you with the forearm supported on a table to stabilize the forearm effectively.

Wrist Flexion

To increase wrist flexion.

Hand Placement and Procedure

- The forearm may be supinated, in midposition, or pronated.
- Stabilize the forearm against the table and grasp the dorsal aspect of the patient's hand.
- To elongate the wrist extensors, flex the patient's wrist and allow the fingers to extend passively.
- To further elongate the wrist extensors, extend the patient's elbow.

Wrist Extension

To increase wrist extension (Fig. 4.24).

FIGURE 4.24 Hand placement and stabilization of the forearm for stretching procedure to increase extension of the wrist.

Hand Placement and Procedure

- Pronate the forearm or place it in midposition, and grasp the patient at the palmar aspect of the hand. If there is a severe wrist flexion contracture, it may be necessary to place the patient's hand over the edge of the treatment table.
- Stabilize the forearm against the table.
- To lengthen the wrist flexors, extend the patient's wrist, allowing the fingers to flex passively.

Radial Deviation

To increase radial deviation.

Hand Placement and Procedure

- Grasp the ulnar aspect of the hand along the fifth metacarpal.
- Hold the wrist in midposition.
- Stabilize the forearm.
- Radially deviate the wrist to lengthen the ulnar deviators of the wrist.

Ulnar Deviation

To increase ulnar deviation.

Hand Placement and Procedure

- Grasp the radial aspect of the hand along the second metacarpal, not the thumb.
- Stabilize the forearm.
- Deviate the wrist ulnarly to lengthen the radial deviators.

The Digits: Special Considerations

The complexity of the relationships among the joint structures and the intrinsic and multijoint extrinsic muscles of the digits requires careful examination and evaluation of the factors that contribute to loss of function in the hand because of limitation of motion. The therapist must determine if a limitation is from restriction of joints, decreased muscle flexibility, or adhesions of tendons or ligaments. The digits should always be stretched individually, not simultaneously. If an extrinsic muscle limits motion, lengthen it over one joint while stabilizing the other joints. Then hold the lengthened position and stretch it over the second joint, and so forth, until normal length is obtained. As noted in Chapter 3, begin the motion with the most distal joint to minimize shearing and compressive stresses to the surfaces of the small joints of the digits. Specific methods of intervention for dealing with adhesions of tendons are described in Chapter 19.

CMC Joint of the Thumb

To increase flexion, extension, abduction, or adduction of the carpometacarpal (CMC) joint of the thumb.

Hand Placement and Procedure

- Stabilize the trapezium with your thumb and index finger.
- Grasp the first metacarpal (not the first phalanx) with your other thumb and index finger.
- Move the first metacarpal in the desired direction to increase CMC flexion, extension, abduction, and adduction.

Hand Placement and Procedure

- Pronate the forearm or place it in midposition, and grasp the patient at the palmar aspect of the hand. If there is a severe wrist flexion contracture, it may be necessary to place the patient's hand over the edge of the treatment table.
- Stabilize the forearm against the table.
- To lengthen the wrist flexors, extend the patient's wrist, allowing the fingers to flex passively.

Câu trả lời là kéo dãn có trợ giúp (assisted stretching)

Tóm tắt

- Stretching khác AAROM
- Stretching để tăng ROM
- AAROM để duy trì, tăng sự co cơ, không có mục tiêu tăng ROM
- Kéo dãn cẩn thận trong gãy xương
  - Lành xương chưa hoàn toàn
  - Kẹt khớp
  - Viêm

Kéo dãn trong chương trình PHCN

	Giai đoạn sớm	**Giai đoạn trung gian**	**Giai đoạn muộn**
Mục tiêu	Kháng viêm Tăng ROM	Tăng ROM Mạnh cơ	Mạnh cơ Tăng ROM
Kĩ thuật	Bất động PROM AAROM	AAROM AROM Stretching	AROM PRE (progressive resistance program) Stretching

AAROM, PROM không trực tiếp tăng ROM nhưng trong quá trình tập thì ROM tự cải thiện
Stretching có thể dùng từ giai đoạn trung gian, nếu cần, nhưng cẩn thận

Vài suy nghĩ

- Cẩn thận, chau truốt trong từ ngữ
- Biên soạn phần thuật ngữ Việt-Anh
- Tham khảo tài liệu gốc, giá trị. Tránh “tam sao thất bổn”