Stretching

CHAPTER 1

In this chapter, you will learn about:

- Mechanical and physiological properties of soft tissues.
- Effects of various factors on soft tissues.
- Determinants of stretching.
- Types of stretching.

Definition of flexibility

Sr. No.	*Flexibility*	*Brief about it*
1	Dynamic flexibility	
2	Static flexibility	

What is hypomobility?

Factors that contribute to restricted motion

Sr. No.	*Contributing factor*	*Examples*
1		
2		
3		
4		

Indication of stretching

Contraindication of stretching

What is contracture?

Sr. No.	*Types of contractures*	*Structure involved*
1	Myostatic	
2	Pseudomyostatic	
3	Arthrogenic and periarticular	
4	Fibrotic and irreversible	

Interventions to increase mobility

Sr. No.	*Technique*	*Brief about it*	*The structure for which it is intended*
1	Stretching		
2	Self-stretching		
3	Neuromuscular facilitation and inhibition techniques		
4	Muscle energy techniques		
5	Joint mobilization/Manipulation		
6	Soft tissue mobilization and manipulation		
7	Neural tissue mobilization (neuromeningeal mobilization)		

What is selective stretching? Give two examples.

Effect of immobilization on contractile portion of muscle

Effect of immobilization in shorten position	
Effect of immobilization in lengthen position	

Composition of connective tissue

Collagen fibers	• _____ • _____ • _____ • _____
Elastin fibers	• _____ • _____ • _____ • _____
Reticulin fibers	• _____ • _____ • _____ • _____
Ground substance	• _____ • _____ • _____ • _____

Draw the structure of muscle spindle.

Draw the stress strain curve and explain its regions.

Sr. No.	*Region*	*Brief about it*
1	Toe region	
2	Elastic range	
3	Elastic limit	
4	Plastic range	
5	Ultimate strength	
6	Failure	
7	Structural stiffness	

Creep

Figure	*Explain*

Stress relaxation

Figure	*Explain*

Practical application of

Creep	*Stress relaxation*

Write down the effect of various conditions on collagen fibers.

Sr. No.	*Condition*	*Changes*
1	Effect of immobilization	
2	Effect of inactivity	
3	Effect of age	
4	Effect of corticosteroids	
5	Effect of injury	

Determinants of stretching

1. Alignment and stabilization

Sr. No.	*Determinants*	*Brief about it*	*Example*
1	Alignment		
2	Stabilization		

2. Intensity of stretch

Benefits of low-intensity stretching are:

3. Duration of stretch

Duration of stretch refers to:

Summary

Findings from several studies related to duration of stretch are:

a. Higher the intensity _____ (lower or higher) the duration.

b. Lower the intensity _____ (lower or higher) the frequency.

c. Lower the intensity _____ (lower or higher) the duration.

d. Higher the intensity _____ (lower or higher) the frequency.

e. The safest stretch is _____ (lower or higher) intensity _____ (shorter or longer) duration.

f. There is _____ (more or no or less) benefit to extend stretch duration beyond 60 seconds.

g. Cyclic stretching is _____ (more or less) effective then static stretching when duration of stretch is same.

	Static stretching	*Static progressive stretching*	*Cyclic stretching*
Method of application			
Duration of stretching			

4. Speed of stretch

Benefits of slow stretching are:

Ballistic stretching:

5. Frequency of stretch

Frequency of stretching refers to:

It depends on:

6. Mode of stretch

Sr. No.	*Mode of stretch*	*Brief about it*
1	Manual stretching	
2	Mechanical stretching	
3	Self-stretching	
4	Active stretching	
5	Passive stretching	

General precautions to be taken for stretching

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Special precautions for mass market flexibility programs

1.

2.

3.

4.

5.

6.

7.

Adjuncts to stretching interventions

Sr. No.	*Adjuncts*	*Brief about it*
1		
2		
3		
4		
5		

Let's practice muscular stretching

General principle: To stretch any muscle, therapist will have to perform _____ (similar or opposite) action of that muscle.

Passive stretching techniques

1. To improve shoulder flexion ROM

Movement to be performed	Shoulder flexion
Structure to be stretched	Shoulder extensors
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

2. To improve shoulder hyper-extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

3. To improve shoulder abduction ROM

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

4. To improve shoulder external rotation ROM

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

5. To improve shoulder internal rotation ROM

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

6. To improve horizontal abduction of the shoulder

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

7. To improve elbow flexion ROM

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

8. To improve elbow extension ROM

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

9. To increase supination–pronation of forearm

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

10. To increase wrist flexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

11. To increase wrist extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

12. To increase radial deviation

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

13. To increase ulnar deviation

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

14. To increase flexion, extension, abduction, adduction of the carpometacarpal joint of thumb

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

15. To increase flexion, extension, abduction or adduction of the MCP joints of the digit

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

16. To increase flexion or extension of the proximal and distal interphalangeal joints

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

17. To increase hip flexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

18. To increase hip flexion with knee extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

19. To increase hip extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

20. To increase extension of the hip with knee flexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

21. To increase hip abduction

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

22. To increase hip adduction

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

23. To increase hip external rotation

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

24. To increase hip internal rotation

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

25. To increase knee flexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

26. To increase knee extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

27. To increase ankle dorsiflexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

28. To increase ankle plantarflexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

29. To increase axial extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

30. To increase upper cervical flexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

31. To increase lumbar flexion

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

32. To increase lumbar extension

Movement to be performed	
Structure to be stretched	
Patient position	
Therapist position	
Stabilization	
Hand placement and procedure	

Let's Practice

Name of subject: _____

Date of application: _____

Objective	
Structure stretched	
Position of the patient	
Position of therapist	
Procedure	
Type of stretching	
Intensity	
Duration	
Repetition	

Name of subject: _____

Date of application: _____

Objective	
Structure stretched	
Position of the patient	
Position of therapist	
Procedure	
Type of stretching	
Intensity	
Duration	
Repetition	

Name of subject: _____

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Structure stretched	
Position of the patient	
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Intensity	
Duration	
Repetition	

Terminology

Sr. No.	*Terminology*	*Brief about it*
1	Elasticity	
2	Viscoelasticity	
3	Plasticity	

MAKE CORRECT CHOICE

1. What can be used adjunct to stretching intervention?

a. Heat
b. Relaxation training
c. Massage
d. All of the above

2. For healthy hypomobile individuals, minimum frequency of stretching should be:

a. 2 times per week
b. 3 times per week
c. 5 times per week
d. 6 times per week

3. Effect of creep suggests us to apply stretching for:

a. More duration
b. Short duration
c. Short duration with high frequency
d. None of the above

4. Which of the following is an advantage of PNF stretching over other types of stretching?

a. It requires less time to perform
b. It can be performed alone without the help of a therapist
c. It produces the greatest increase in flexibility
d. It can be used to increase both flexibility and strength

5. Which of the following is *not* an example of soft tissue stretching technique?

a. Passive stretching
b. PNF stretching
c. Active stretching
d. Isometric stretching

Bibliography

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