MANUAL of PHYSICAL THERAPY

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Manual of Physical Therapy

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17 Temporomandibular Joint

Steven L. Kraus

Temporomandibular joint (TMJ) dysfunction is an abnormal condition of the TMJ that results from neither a developmental abnormality, disease, or trauma sufficient to cause a fracture or dislocation. TMJ dysfunction involves the capsule and/or intracapsular structures. TMJ dysfunction can be a complication of any one or a combination of the preceding disorders. TMJ dysfunction, however, can also occur as a separate entity. In an average clinical setting, the most common disorder of the TMJ will be dysfunction. Reviewed in this chapter are the more common dysfunctions of the TMJ. Such dysfunctions can also occur separately or in any combination with each other.

ANTERIORLY DISLOCATED DISC WITH REDUCTION

When the patient is in a maximum intercuspated position (back teeth are together), the disc is anteriorly dislocated to the condyle. During opening of the mouth, the disc relocates itself to the condyle, and upon closing the mouth, the disc dislocates anteriorly to the condyle.

Cause

The primary cause for the disc to dislocate anteriorly to the condyle is the elongation of the collateral ligaments, the slope of the articular eminence, the elasticity of the superior stratum, and tone of the upper head of the external pterygoid muscle. The shape of the condylar head and disc are other variables that will contribute to an altered position of the disc on the condyle.

The tissue that is primarily responsible for relocation of the disc on the condyle during opening is the superior stratum.

Symptoms

If painful, pain will be felt in the region of the TMJ on the side of involvement with possible reference of pain into areas innervated by cranial nerve V. Pain will increase or be altered during functional and parafunctional (bruxism) movements of the mandible.

Signs

During mandibular opening, there will be a "click" or "snap" and then during closing another click or snap; this is the reciprocal click. The opening click will usually occur at the beginning or middle range of opening, whereas the closing click will occur toward the end of the closing.

Treatment

If pain or hindrance in function warrants treatment, a common treatment is an anterior repositioning appliance or a nonrepositioning appliance applied by a dentist (Fig. 17-1). The dentist should be adequately trained in the use of such an appliance and have a good clinical understanding of this dysfunction. Physical therapy modalities to decrease pain and any associated muscle guarding will enhance the effectiveness of the appliance. If either appliance is not successful in maintaining proper disc-condyle positioning, and the pain or hindrance in function is significant to the patient and clinician, then an oral surgery consultation is indicated.

Management

Management may best be accomplished by the normalization of muscle tone and function. If a

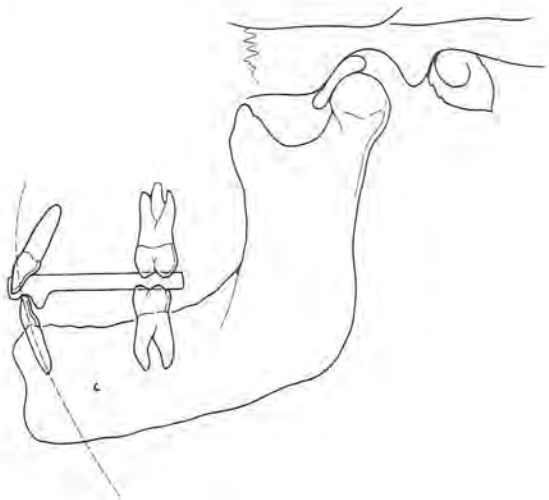

Fig. 17-1 An anterior repositioning appliance in the treatment of an anterior disc dislocation that reduces. (Razook, SJ: Nonsurgical management of TMJ and masticatory muscle problems. p. 130. In Kraus SL (ed): TMJ Disorders: Management of the Craniomandibular Complex. Churchill Livingstone, New York, 1988.)

satisfactory and stable disc-condyle position has been achieved, specific occlusal work in selected cases may be indicated. Otherwise, periodic use of an intraoral appliance and physical therapy may be the best management of this dysfunction. Physical therapy to help in relaxation of muscle tone of the jaw and cervical muscles through patient education and exercises as well as the use of modalities should be beneficial.

Prognosis

Satisfactory to good

ANTERIORLY DISLOCATED DISC WITHOUT REDUCTION

During all movements and positioning of the mandible, the disc remains anteriorly dislocated to the condyle.

Cause

This dysfunction has the same cause as discussed above for an anterior disc dislocation that reduces, regarding the mechanism that caused the disc to dislocate. The disc, however, stays anterior to the condyle during all jaw movements because of an increase in muscle guarding of the mandibular elevator muscles and/or elongation of the superior stratum.

Symptoms

If painful, pain will be felt in the TMJ on the side of involvement with possible reference of pain into areas innervated by cranial nerve V. Pain increases during functional and parafunctional movements of the mandible.

Signs

In the initial stages (less than 6 months), joint noises will not be heard during mandibular movements. The mandibular opening will be less than functional opening (25 mm) with deflection to the side of involvement. Deflection to the side of involvement during protrusive mandibular movement will be seen, and lateral mandibular movement will be decreased to the opposite side of the involvement.

In the chronic stage (greater than 6 months), the disc has been "shoved" further anterior to the condyle. Mandibular dynamics will not be as restricted as was seen in the acute stage. However, joint noises of crepitus are present throughout full opening and closing.

Treatment

If pain or hindrance in function warrant treatment, apply manual intraoral techniques of distraction and translation to the involved side (Fig. 17-2). Once the disc is relocated on the condyle, usually confirmed by a "snap" and normal mandibular dynamics, place cotton rolls between the molars and proceed immediately with what was the treatment discussed for an anterior disc dislocation that reduces. If unsuccessful in relocating the disc and the pain or hindrance in function is significant to the patient and clinician, a nonrepositioning appliance or oral surgery is indicated.

Management

Once the disc is relocated on the condyle, management of the disc-condyle position is the same as for anterior disc dislocation that reduces.

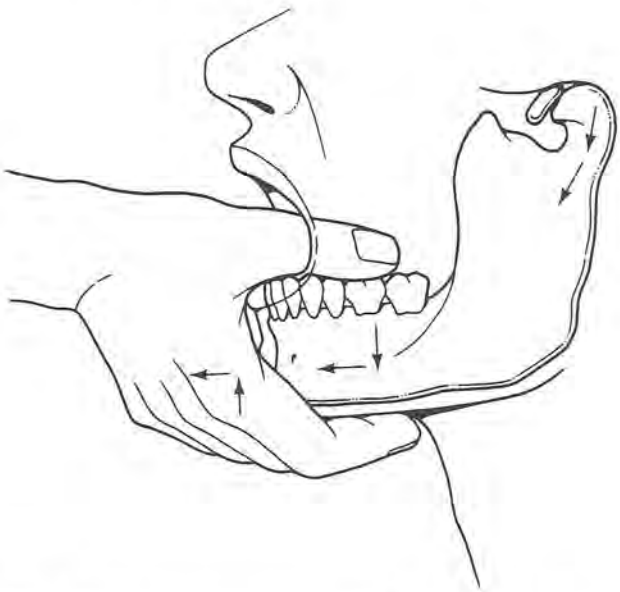

Fig. 17-2 Intraoral technique of distraction and translation used in an attempt to "recapture" an anterior disc dislocation that does not reduce. (Kraus S: Temporomandibular joint. In Saunders D: Evaluation, Treatment and Prevention of Musculoskeletal Disorders. Duane Saunders, Minneapolis, MN, 1985, with permission.)

Prognosis

Satisfactory to good

HYPOMOBILITY SECONDARY TO CAPSULAR TIGHTNESS

Capsular tightness is a result of the intermolecular cross-linking—adhesions of collagen fibers. A capsule may be partially or totally tight.

Causes

Capsular tightness may result from trauma, immobilization, and acute or chronic inflammatory processes.

Symptoms

If painful, the pain will be felt over the side of involvement with possible reference into areas innervated by cranial nerve V. Pain will increase during functional and parafunctional movements of the mandible.

Signs

If a complete capsular tightness is present, mandibular opening will be less than the functional opening with deflection to the side of involvement. Deflection to the side of involvement during protrusive mandibular movement will be seen, and lateral mandibular movement will be decreased to the opposite side of the involvement.

Treatment

Modalities to decrease pain and increase extensibility of the capsular tissue are offered. This may be accomplished with heat and ultrasound while tongue blades are placed intraorally. Intraoral arthrokinematic techniques are then applied to further enhance capsular extensibility (Fig. 17-3).

Management

Patient will need to be instructed in a home treatment program (heat and tongue blades) to maintain what capsular extensibility is accomplished during the treatment session. Capsular tightness resulting from acute or chronic inflammatory processes will require a prolonged management program.

Prognosis

Poor to excellent, depending on cause

HYPERMOBILITY (SUBLUXATION)

By agreement, subluxation is said to occur when the condyle moves anteriorly to the crest of the articular eminence onto the articular tubercle.

This condition occurs readily in an asymptomatic population. However, in the presence of other dysfunctional TMJ conditions, hypermobility may perpetuate the problem. Depending on the frequency and duration of subluxing, subluxation can cause pain and other TMJ dysfunctions.

Causes

Hypermobility is caused by predisposing osseous structures of the TMJ and capsular-ligamentous laxity.

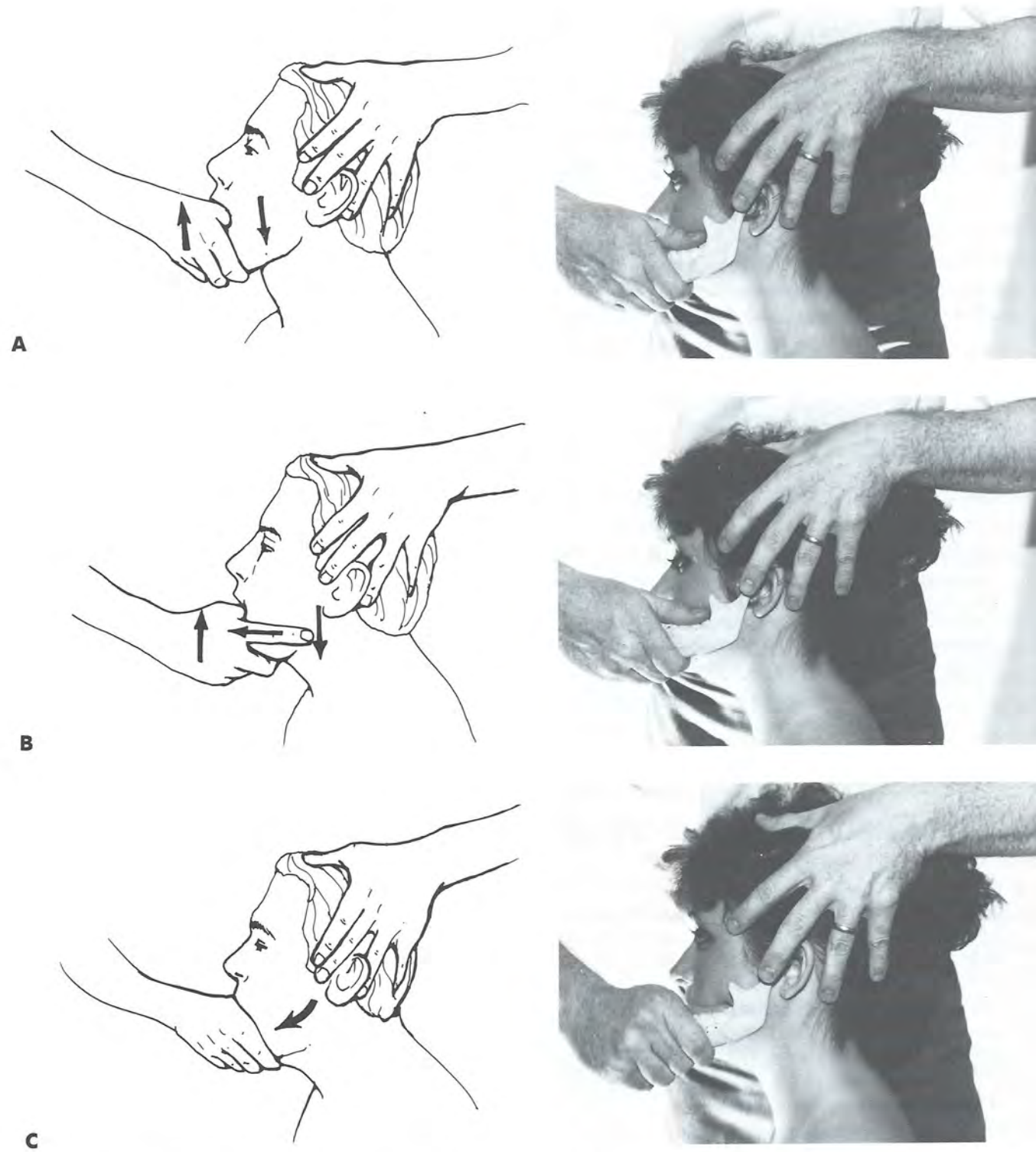

Fig. 17-3 Intraoral techniques used in the treatment of capsular tightness. Notice that techniques A and B are the same techniques used in the treatment of an anterior disc dislocation that does not reduce. The difference in the techniques is the range, amount, and duration of the force rendered. **(A)** Distraction. **(B)** Distraction with translation. **(C)** Lateral glide (joint play). (Kraus SL: Temporomandibular joint. In Saunders D: Evaluation, Treatment and Prevention of Musculoskeletal Disorders. Duane Saunders, Minneapolis, MN, 1985, with permission. Photos from Kraus SL: Physical Therapy Management of TMJ Dysfunction. p. 139. In: Kraus SL (ed): TMJ Disorders: Management of the Craniomandibular Complex. Churchill Livingstone, New York, 1988.)

Symptoms

If painful, pain will be over the TMJ on the involved side with possible reference of pain into areas innervated by cranial nerve V. Pain will increase or may only be present at the end of opening.

Signs

If subluxation occurs unilaterally, the mandible during opening will deflect abruptly to the opposite side of the involvement at the end of opening. At the beginning of closing, the mandible will abruptly swing back to midline.

Treatment

Educate the patient as to what point in jaw opening subluxation occurs. Treatment is to instruct the patient on exercises that will not open the mouth wide enough to produce the subluxation. Modalities such as heat, ice, and ultrasound will be beneficial if this condition is painful.

Management

Patient awareness and cooperation is essential.

Prognosis

Good to excellent

STRAIN

Any force through the mandible having sufficient repetitive impact, magnitude, duration, and direction can cause deformation of the pain-sensitive tissues such as the capsule, disc, and retrodiscal tissues.

Causes

Strain may be caused by micro- or macrotrauma with or without sufficient increase in muscle activity. Such trauma contributes to capsulitis and/or retrodiscal inflammation.

Symptoms

Pain occurs on the side of involvement in the area of the TMJ with possible reference of pain into areas innervated by cranial nerve V. Pain increases during functional and parafunctional movements of the mandible.

Signs

Patient may be hesitant to move the mandible because of pain. Depending on the degree of intracapsular edema, the patient may also be unable to bring his back teeth together on the side of involvement owing to the edema.

Treatment

Treatment consists of modalities to decrease pain and muscle guarding. Ice, heat, or ultrasound can be applied to the TMJ, depending on amount of edema present. Electric stimulation to the mandibular elevator muscles can help in muscle relaxation. If inflammation persist, a nonrepositioning appliance applied by the dentist may be beneficial.

Management

Management goals are to decrease inflammation and normalize muscle tone.

Fig. 17-4 Shoulder girdle strengthening excercise. This exercise helps to improve tone for the shoulder girdle external rotators and scapular retractor muscles. The starting position is holding an elastic tubing palms up, elbows to the side, and bent 90° with good head-neck posture. Patient is instructed to pinch the shoulder blades together slightly while externally rotating at the glenohumeral joint. The patient is asked to breathe out so he will not be holding his breath.

Prognosis

Good to excellent, in approximately 2 to 4 weeks depending on the magnitude of the trauma

MUSCLE IMBALANCE OF THE CERVICAL SPINE

The reader should not assume that muscle imbalances of the cervical spine are caused by TMJ dysfunction or vice versa. A brief overview of the management of cervical spine muscle imbalance is included here because of the frequently associated muscle hyperactivity and accompanying symptoms observed in both the mandibular and cervical spine areas. Mandibular and cervical spine muscle hyperactivity can occur in the absence of any TMJ involvement. When the TMJ is involved, however, treatment should always include the control of muscle hyperactivity. Clinical observations demonstrate that when cervical spine muscle imbalances are managed, more efficient control over mandibular muscle hyperactivity is often achieved. Therein lies the importance of considering muscle imbalances of the cervical spine in the management of the symptomatic TMJ. For a more detailed explanation of the cervical spine influencing the temporomandibular region, the reader is referred to Kraus SL: Cervical spine influences on the craniomandibular region. In Kraus SL (ed): *TMJ Disorders: Management of the Craniomandibular Complex.* Churchill Livingstone, New York, 1988.

The term muscle imbalance is referred to in this section as altered muscle tone, which is demonstrated by some muscles as an increase in tone, and in others as a decrease in tone. Muscle imbalances secondary to neurobiological and nutritional diseases and to trauma will not be a part of this discussion.

Clinically, a high percentage of muscle imbalances have an insidious onset. Trauma, of course, would further compound the pre-existing muscle imbalances. Muscle imbalances can involve other tissues of the spine such as the disc, facet joints, capsules, and nerves. Muscle imbalances and other tissue involvement (joints, disk, connective tissue) secondary to the muscle imbalances contribute to the altered afferent input to the central nervous system (CNS). Such altered afferent input to the

Fig. 17-5 Anterior cervical strengthening exercises. Patient is taught how to tuck the chin in. From this chin-tuck position the patient is asked to raise his head 4 to 6 inches off the table/floor. Pausing only slightly, the patient lowers his head to the mat, keeping the chin tucked in. It is important to inform the patient not to clench or hold his breath while doing the exercise.

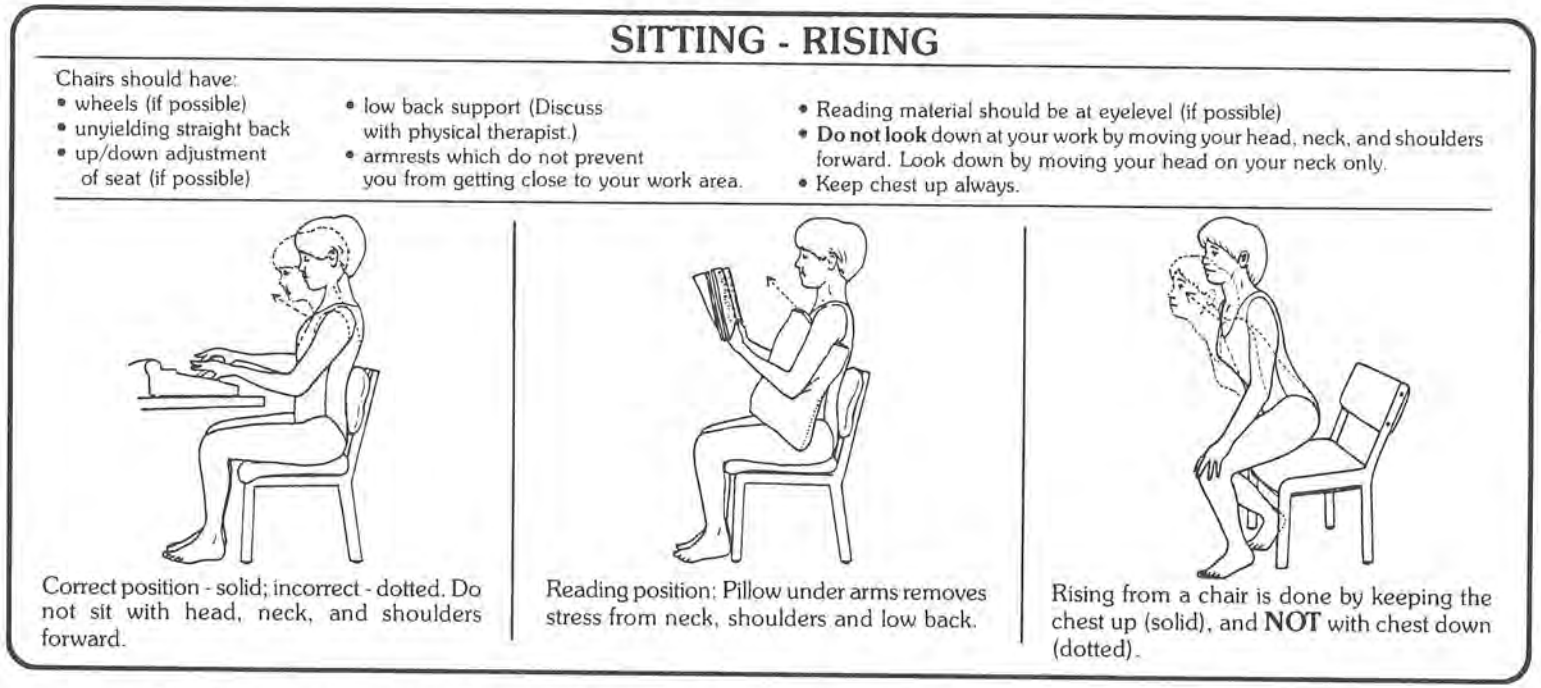

Fig. 17-6 Chest awareness. Misuse of the cervical spine and associated muscles can easily occur during various daily movements and positions. A very simple, effective way for the patient to become more aware of proper movement and positioning of the cervical spine is to instruct the patient to maintain and initiate movement, keeping the chest up and chin slightly tucked in. This will be beneficial when getting up and down from a sitting position, standing or sitting, or during other functional activities involving head-neck positioning. (Kraus S: Cervical Spine Mobility. Stretching Charts Inc. Tacoma, WA, 1987, with permission.)

Fig. 17-7 Manual traction is a nonspecific traction applied to the cervical spine. The bottom hand placement is on the occiput so that the middle finger and thumb are "hooking" the mastoid processes. It is not advisable to pull through the mandible. The traction is applied along the longitudinal axis of the body. The poundage of pull using manual traction is immaterial. Instead, the amount is based on the patient and tissue(s) response.

Fig. 17-8 "Upper arc" stretch. This technique is directed toward the posterior lateral cervical muscles and soft tissues. The active hand on the head supports the occiput, similar to the manual traction hold, and the other hand stabilizes the shoulder. The active hand will rotate the chin-nose away from the side of the stabilizing hand; at the same time the head-neck is taken into an up and forward diagonal direction. Care should be taken to avoid excessive side bending. Additional stretch can be achieved by the stabilizing hand pushing down on the shoulder. When areas of "tightness" are located, the stretch can be maintained or a hold relax contraction can be applied.

Fig. 17-9 "Lower arc" stretch. This technique is directed toward the anterior lateral cervical muscles and soft tissues. The active and stabilizing hands are the same as in Figure 17-8. The difference is that the active hand will rotate the chin-nose toward the side of the stabilizing hand, and at the same time the head-neck is taken into a down and back diagonal direction. Care should be taken to avoid excessive sidebending. When areas of "tightness" are located, the stretch can be maintained or a hold relax contraction can be applied.

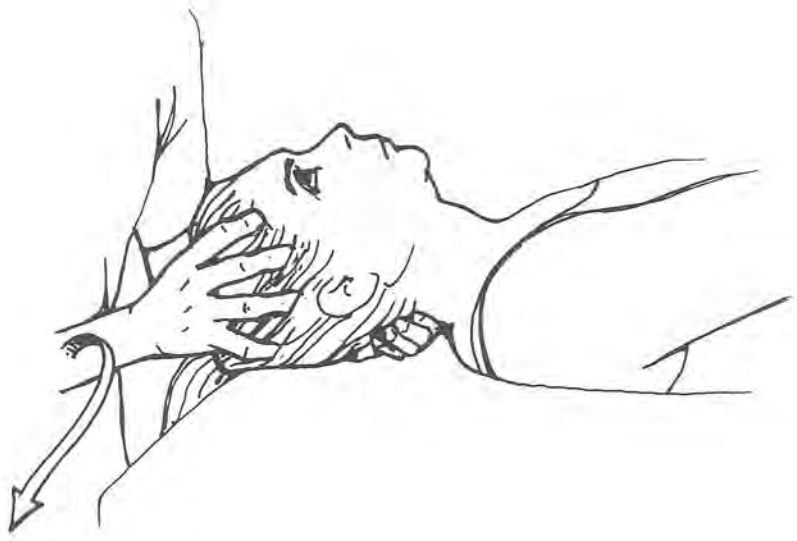

Fig. 17-10 "Melting" stretch. This technique is more specific to the muscles and soft tissues that are tight in the area of a segment. One hand cradles the neck, with the tip of the index finger making specific contact in an articular pillar of the cervical column. The active hand grasps the cranium. With moderate traction from both hands, the active hand directs the head into a down and back diagonal direction; allowing the chin-nose to rotate, side bend, and extend to the side of the index finger of the hand that is cradling the neck (the "melt").

CNS is believed to contribute to symptoms of the cervical spine and those referred to the head and upper extremities.

Symptoms can be extremely variable from patient to patient and within the same patient. Complaints of stiffness, tiredness, aching, tingling, numbness, vertigo, and nausea are all possible symptoms seen clinically that can respond well to the treatment of muscle imbalances and of the associated tissues of cervical spine dysfunction. The clinician will always be alert to the need for a medical consultation if such symptoms persist.

Causes

Muscle imbalances may be caused by misuse of cervical musculature by (1) occupational hazards; (2) lack of self-awareness during sitting, standing, and movements; (3) lack of specific exercises; (4) improper sleeping postures. Muscle imbalance may also result from emotional or environmental stressors.

Symptoms

Symptoms can be extremely variable but classically the patient will complain of tension-tightness, limitation in neck movement, and various referred pain to the head, upper extremities, and midback.

Signs

Posterior cervical/shoulder girdle muscle tone will be increased with associated myofascial trigger points as observed during palpation. Patient will often position his head classically in a forward head posture.

Treatment

Treatment modalities should be delivered to the tight musculature. The patient should be taught postural re-education exercises (Figs. 17-4 to 17-6). Manual therapy techniques are applied to the tight muscle and soft tissues (Figs. 17-7 to 17-10). Cervical and lumbar supports are provided as needed.

Management

Once the patient has been given freedom of movement (better mobility of muscle, soft tissue, joints) in the cervical spine and correct instructions on how to maintain better muscle function through exercises and supports, and if the patient has the opportunity or creates the opportunity to follow through with exercises, then management is often the patient's responsibility. Because of the various environmental and emotional stresses we are all faced with, periodic re-evaluation and treatment by the therapist is suggested.

Prognosis

Good to excellent