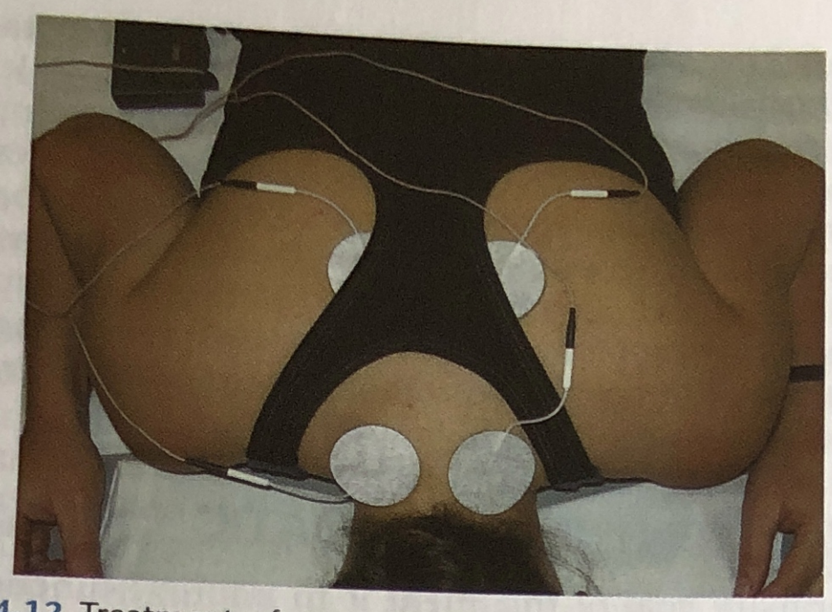

FIG 24-12 Treatment of upper back and neck pain with electrical stimulation. *(From Cameron MH:* Physical agents in rehabilitation: from research to practice, *ed 3, St Louis, 2009, Saunders.)*

contraindications include swelling, fever, infection, hemorrhage, or malignancy.[24] Heat can increase the pain threshold, increase blood flow, wash out pain-producing metabolites, and decrease muscle guarding.[15,24] Heat increases the extensibility of **connective tissue** and should be combined with a low-stress prolonged stretch to increase flexibility.[24] In patients with RA, improved ROM, improved grip and pinch strength, and reduced pain and stiffness were found with paraffin wax baths.[67]

Electrical Stimulation. Transcutaneous electrical nerve stimulation (TENS) is effective in decreasing pain (Fig. 24-12).[24] A TENS unit should never be placed close to the heart in a patient with a pacemaker.[16] TENS uses the gate theory to block pain by stimulating larger sensory fibers, which then block the smaller pain C fibers. C fibers innervate the synovium and joint capsule, so blocking pain perception in these fibers is beneficial to decreasing pain in patients with arthritis. A systematic review by Brosseau and colleagues[11] found TENS to help decrease pain in RA.

Range of Motion

ROM and gentle stretching are an important component of exercise in arthritis because they can relieve stiffness, increase joint mobility, and increase muscle length.[47] Intensity, duration, and frequency of ROM and stretching should take into consideration the phase of arthritis (Table 24-3).

In the acute phase, patients should decrease activity and rest the inflamed joint.[47] Splinting also helps to reduce pain and inflammation by immobilizing or supporting the joint.[23] Reduced stress on the joint capsule and synovial lining through splinting reduces pain and inflammation.[23] Rest is needed during the acute phase, but gentle ROM to maintain joint motion is still important. The goal of ROM and gentle stretching in the acute phase is not to gain flexibility but to maintain it, so the tissues should not be overstretched. Tensile strength is decreased in inflamed tissues, and tears are more likely to occur. ROM exercise should be performed at least once a day to maintain proper flexibility.[47]

TABLE 24-3 Joint Protection Suggestions

Joint	Management Suggestion

Hand	AROM without pain including digit flexion, wrist flexion and extension, wrist ulnar deviation (with RA)
	Maintain thumb web space
	MP
	• Avoid power grasp, lateral pinch
	• Use palm over fingers to open jars
	• Two hands instead of one
	• Swan neck
	  • Avoid intrinsic plus
	  • Encourage PIP flexion with MP extension
	• Boutonnière
	  • Avoid fingers flexed at rest
	  • Daily DIP flexion with PIP extension ROM
	  • Stress MTP extension with PIP and DIP flexion

Wrist	Avoid stirring with utensil diagonal in palm Avoid heavy lifting (hook grasp for bag)
Elbow	Avoid flexion contractures by positioning in gentle extension at rest Gentle supination/pronation to maintain AROM
Shoulders	Avoid decreased ROM all planes Tenderness inferior and lateral coracoids Be careful of GH subluxation
Spine	Core stabilization
Hip	Avoid sitting with legs crossed Avoid asymmetric weight bearing Open seat ankle Avoid loss of abduction and rotation Avoid flexion contracture
Knees	Stand up with knees apart to prevent valgus Avoid hyperextension
Feet	Arch supports Hallux valgus Sit to stand with COG forward

AROM, assisted range of motion; *COG,* center of gravity; *DIP,* distal interphalangeal; *GH,* glenohumeral; *MP,* metacarpophalangeal; *MTP,* metatarsophalangeal; *PIP,* proximal interphalangeal; *RA,* rheumatoid arthritis; *ROM,* range of motion.

During the subacute or chronic phase of arthritis, a goal may be to increase flexibility, so a gentle stretch at the end of joint ROM should be maintained. Intensity of the stretch should be gentle during subacute arthritis and aggressive during the chronic phase. Stretching should be performed two to three times a day with two to five repetitions performed on each joint.[47] If symptoms are subacute, five warmups with two to five more aggressive stretches can help improve motion. When joint symptoms are chronic, three to five warmups with one to two maximum tolerated stretches are recommended. Each stretch should be held 10 to 30 seconds depending on the pain involved.[47] Pain should never last longer than 1 to 2 hours after exercise; if pain persists longer than 2 hours, the intensity of exercise needs to be decreased.

Strengthening

Therapeutic exercise programs for individuals with RA and OA must take into account the arthritic process, including the amount of inflammation, joint stability, and muscle