Effectiveness of Cervical Traction in Modulating Pain and Reducing Symptoms in Patients with Cervical Radiculopathy
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Research Question
Does cervical traction modulate pain, reduce symptoms, and improve function in patients with cervical radiculopathy? What kind of traction modalities are considered the most effective?

Background
Cervical radiculopathy is a disorder that affects nerves in the neck, usually from nerve root compression from a herniated disc or narrowing of the neural foramen. The nerve roots most commonly affected are C6 and C7 in the lower part of the cervical spine. A person with cervical radiculopathy may experience pain in their neck and arm, as well as muscle weakness and/or numbness or tingling in their fingers or hands. Cervical radiculopathy is a common disorder that effects 83 per 100,000 people and commonly affects people in their 40th to 60th decade of life. Up to 50% of the adult population will experience upper extremity pain at some time in their lifetime. One treatment modality for patients with cervical radiculopathy is cervical traction, which places distraction forces on the cervical spine in an effort to decrease pressure to the involved nervous root. Cervical traction is considered as the treatment of choice for cervical radiculopathy. Goals for cervical traction are usually pain reduction, symptom reduction, and improvement of function, including regaining sensation and increasing muscle strength. This project is a review of the literature on the efficacy of cervical traction in modulating pain and reducing symptoms such as decreasing sharp pain, sensory numbness and motor weakness in patients with cervical radiculopathy. Efficacy is found, the appropriate parameters relative to the application of cervical traction will be provided.

Outcomes Assessment
Three studies utilized the visual analog scale to determine if pain decreased after cervical traction treatment to modulate pain. One study examined grip strength and force to pain onset to determine if pain decreased as a result of cervical traction. The visual analog scale was considered a universal pain scale that is widely accepted for quantifying pain based on patient perception.

Traction and Neuromobilizations Performed in the Reference Studies

Jellad A, Salah Z, Oukdoul K, Mignone H, Boubi I, Rejeb N; 2009
- Post-test: Cervical pain, radicular pain, pain intensity, and the neck disability index of 19 patients: Pre-test: manual cervical traction with the neck flexed to 30 degrees. Control group: cervical traction with the neck neutral. Post-test: cervical traction was performed in supine position.
- Intervention group: manual cervical traction was performed in supine position. All patients showed a significant reduction in neck pain in groups A and B with (p=0.009 and p=0.001).
- The radial pain decreased in groups A and B (p=0.008 and 0.001) as the results of neurodynamic relief improved in groups A and B, and A and B with (p=0.001).
- Groups A, B, and C showed significant reduction in analgesic consumption (p=0.021, p=0.001, p=0.012).

Fritte J, Thackray A, Beelman G, 2014
- Exercise group: function and pain.
- Control group: function and pain.
- The intervention group was a single-blind study.
- The post-test was conducted 72 hours after the last visit.
- 38 patients were successfully recruited for the intervention group (Cervical traction for 10 sessions, 30 min each).
- Patients were recruited from physicians and the physical therapy offices in Salt Lake City, UT, and San Antonio, TX.
- Mean age: 46.9 years old.

- Post-test: grip strength, neck disability index, pain intensity, neck disability index, neck pain scale, cervical spine AROM.
- Pre-test: same as above.
- Double-blinded study.
- Exercise intervention.
- Intervention group: manual cervical traction was performed in supine position to reduce pain.
- Control group: no intervention.

Joghataei MT, Arab AA, Khakoo H; 2004
- Post-test: grip strength, neck disability index, pain intensity.
- Pre-test: same as above.
- Group control: cervical traction RMT.
- Randomized controlled trial: 10 sessions 3x/week.
- Subjects were randomly assigned to control group and intervention groups.
- 15 patients with unilateral C7 radiculopathy were successfully recruited.
- Patients were recruited by physicians for outpatient evaluation and intervention.
- Men: 15
- Women: 0
- Average age: 47 years old.

Literature

Study
Jellad A, Salah Z, Oukdoul K, Mignone H, Boubi I, Rejeb N; 2009
- Interventions: Manual cervical traction performed in neutral position.
- Examination: Cervical pain, radicular pain, pain intensity, and the neck disability index of 19 patients.
- Result: A and B (p=0.009 and p=0.001).
- Cervical traction reduced neck pain and showed significant reduction in analgesic consumption (p=0.021, p=0.001, p=0.012).

Fritte J, Thackray A, Beelman G, 2014
- Interventions: Function and pain.
- Controls: Function and pain.
- Results: The intervention group was a single-blind study.
- The post-test was conducted 72 hours after the last visit.
- 38 patients were successfully recruited for the intervention group (Cervical traction for 10 sessions, 30 min each).
- Patients were recruited from physicians and the physical therapy offices in Salt Lake City, UT, and San Antonio, TX.
- Mean age: 46.9 years old.

- Interventions: Multiple exercises and cervical traction.
- Controls: No intervention.
- Results: A and B (p=0.008 and 0.001) as the results of neurodynamic relief improved in groups A and B, and A and B with (p=0.001).
- Groups A, B, and C showed significant reduction in analgesic consumption (p=0.021, p=0.001, p=0.012).

Joghataei MT, Arab AA, Khakoo H; 2004
- Interventions: Randomized controlled trial: 10 sessions 3x/week.
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- Results: A and B (p=0.008 and 0.001) as the results of neurodynamic relief improved in groups A and B, and A and B with (p=0.001).
- Groups A, B, and C showed significant reduction in analgesic consumption (p=0.021, p=0.001, p=0.012).

Traction Interventions
Jellad A et al conducted a study on patients using a conventional rehabilitation in conjunction with mechanical traction for 25 min traction/10 min rest interval, force gradually increasing from 5 to 12 kg in a pain-free position determined by the manual traction test for 12 sessions.
Fritte J et al conducted a study of cervical traction to determine the strength of the groups with 10 minutes of continuous traction. The traction was applied to the patient for a 60 second hold and 20 second relaxation phase for a total of 15 minutes.
Sarva C et al conducted a study 3x/week where neuromobilization with intermittent manual traction was applied and intensity was gradually increased from Grade 2 to Grade 4 non-thrust.
The study by Joghataei et al examined the efficacy of exercise in conjunction with intermittent cervical traction for 10 sessions 3 times a week for 20 mins with a 7 sec off/on/sec off, 30 lb traction force at 24° angle of pull as the Patient tied in supine with a special pad under his or her head.

Analysis
Multiple randomized controlled studies, have investigated the efficacy of mechanical and manual cervical traction on reduction of radiculopathy
The literature reviewed during this study continually supports mechanical traction as the most efficacious treatment performed in reduction of radiculopathy symptoms. Treatments were performed over a time frame of 3-weeks to 6 months all were able to demonstrate reduction of pain assessed by the visual analog scale scale and grip strength and force to pain onset. Manual traction was also found to be an effective treatment of radiculopathy symptoms.
Reduction of radicular symptoms may be the result of opening of intervertebral foramen, reduction of muscle spasm, reduction of disc nucleus pulposus, and muscle stretching. Risk factors for parameters administered during Jellad et al, group B mechanical traction would have a more desired effect if performed for 5-10 minutes. Two studies by Sarva et al and Joghataei et al were only conducted for 3 and 4-weeks, respectively, and should have follow-up assessment in order to measure the prolonged effects of cervical traction on radiculopathy symptoms.

Conclusion
Mechanical cervical traction applied intermittently to the cervical spine for the purpose of reducing radicular pain was found to be the most effective treatment tested in the studies chosen. Manual traction was found to be an effective alternative if mechanical traction is unavailable.
To be effective the treatment needed to be at least 4 weeks in duration and treatment applied three times a week initially. It was found with a decrease in symptoms, sessions per week could be lessened. Depending on what symptoms lead to the radicular pain the on/off times may vary.

References
Joghataei MT, Arab AA, Khakoo H; 2004; Interventions: Randomized controlled trial: 10 sessions 3x/week.