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## TECHNICAL REPORT

### Semidirect Techniques for FRS dysfunctions of C3

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#### ABSTRACT

##### Keywords:

Neck pain;  
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Some of the recommendations based on the available scientific evidence establish that although there are many trials about the effectiveness of manipulation, there are few descriptions about cervical manipulation for dysfunctions in FRS, and their clinical considerations of being applied. The objective of our trial is to provide the basic generalities for the appropriate application of this therapeutic procedure.

#### INTRODUCTION

Cervical dysfunction in FRS (flexion, side-bending and homolateral rotation) of C3 corresponds to the second law of Fryette<sup>1, 2</sup>, which describes the following: "When the spine is in a flexed or extended position (non-neutral), side-bending to one side will be accompanied by rotation to the same side". This cervical dysfunction of C3 can be primary (traumatic or physiologic) or secondary to a primary adaptation.

Adaptation can be reversible after correcting the primary injury. However, if this adaptation persists over time, it will become a compensation, which requires a

specific treatment<sup>3</sup>. One of the most used techniques to treat this dysfunction in FRS is the semidirect thrust technique, since it allows eliminating the muscle spasm that fixes the dysfunction.

Cervical spine needs great mobility to be able to place the sensory organs in different ranges of motion.

The cervical osteopathic dysfunction is characterised by a restriction of motion in one or several physiologic parameters of that area. This dysfunction may be due to a sudden stretching (whiplash) or to a badly controlled movement.

Osteoarticular mechanical factors and the occupational ones are the most important and common factors of cervicalgia, being able to point out the mechanical cervicalgia as the most frequent form of cervical pain and mobility restriction. This mobility restriction is caused by gamma hyperactivity in neuromuscular spindles that reject being stretched.

Due to this constant spasm in muscles around the neck area, such as the trapezium, sternocleidomastoid (SCM) and scalene among others, cervical pain can be accompanied by headaches, dizziness, nausea, vomiting, shoulder pain and even brachialgias, because of direct and external neuronal impairment, central and intraneural impairment, disc disease, etc.

As a result, there may be pain and sensory motor loss in the distribution of a spinal root.

Psychogenic states like depression and anxiety can cause around this area, among other symptoms, muscle fatigue, somatization and activation of trigger points. Those symptoms are common in patients with fibromyalgia, which is a frequent origin of chronic cervical pains.

Cervical pain can also be caused by alterations in adjacent organs or in vascular structures of the neck. Esophageal pathology, tracheal, carcinomas, polyps, infections, etc. can cause alterations in this area. Nowadays, there is a great variety of applicable treatments for mechanical cervicalgias. Recent studies have proven the effects of different therapeutic interventions for the treatment of cervicalgia such as exercise<sup>4</sup>, manipulation and mobility<sup>5</sup>, acupuncture<sup>6</sup>, patient education<sup>7</sup> and pharmacologic treatment<sup>8</sup>, concluding there is little evidence in the recommendation or contraindication of the mentioned treatments.

## OBJECTIVES

With this technique, we eliminate the spasm that fixes the anteriority of the C3 facet joint, the elongation of intra and periarticular elements (joint capsule and intertransversal ligament), as well as of the nervous structures (Luschka's sinuvertebral nerve) caused by the slippage of nucleus pulposus and maintained by the flexor muscles like intertransverse and spinous transverse that maintains desimbrication and the

mentioned anteriority. This way, we can restore joint mobility.

## IMPLEMENTATION PRINCIPLES

For a FRS dysfunction of C3, we find a restriction of vertebral movement in rotation to the opposite side of the injury, influenced by the profound muscles of the same side as the vertebral rotation. This pathologic situation creates a capsular tensional unbalance in the posterior interapophyseal joints that stimulate the appearance of local and distant symptoms, including pain and functional limitations.

Semidirect technique applied at C3 level for FRS dysfunctions must be applied to patients, after a careful diagnostic examination to determine the indications for the procedure in absence of risks and contraindications.

The osteopath must exclude the coexistence of other local or distant alterations that include risks during the application of the technique.

Patients whom receive this therapeutic procedure must remain calm and relaxed, so that the osteopath can apply the appropriate parameters in a safe way and without pain.

## DIAGNOSTIC ASSESSMENT

Before applying this technique, several differential diagnostic tests must be carried out by the osteopath, such as vascular, imaging, neurological and orthopaedic tests:

- **Klein's test<sup>9</sup>:** This test can be performed with the patient in sitting or supine position, with his/her head protruding on the edge of the table. The osteopath holds the patient's head in his hands and must extend, bend and rotate it, maintaining the positions at the same time, from one side to another during 30 seconds, checking there are no symptoms such as nystagmus, dizziness, altered vision and hearing, altered perception of smells and tastes or unintelligible speech (See figure 1).

This test is used to cause neurologic and vascular symptoms. If these symptoms are awakened, then the test's result is positive and manual treatment with thrust will be contraindicated.

- **Jackson's test**<sup>10</sup>: We will use this test to exclude the cervical disc pathology. This test is considered specific for radiculalgia issues in the upper limb, and it can be explained with biomechanics of the nerve root compression<sup>11</sup> (See figure 2). To perform this test, patient will be sitting on the treatment table with his/her arms arranged along the body and forearms over the thighs in a relaxed position, with the feet on the ground. The osteopath will be standing behind the patient, supporting his/her thorax, in order to stabilise it and will take contact with his hands interlocked over the apex of the patient's skull. The segment of the forearms is stabilised laterally, with the elbows sustained over the anterosuperior side of the patient's shoulders, applying a pressure higher than 10Kg, with both hands in cranial-caudal direction. If there is presence of radicular pain towards the upper limb, it is a sign of positive test result and the existence of a disc compromise. If there is lack of pain, compression will be applied with the head bended to one side and the other. If there is homolateral pain in bending, it evidences a slipped disc, disc osteophyte or disc prolapse. If there is heterolateral pain in bending, it evidences root stretching or disc protrusion.

- **Quickscanning**<sup>12</sup>: This test is performed to confirm the existence of mobility restriction at C3; the patient will be in sitting position. The practitioner will be on one side of the patient, taking the patient's forehead with the anterior hand, in order to support him, and with the posterior one grabs the spinous apophysis of C3 between his thumb and index, applying a posteroanterior movement. If there is restriction, it means that in that segment there is a limited joint mobility.

- **Lateral gliding test**<sup>13, 14</sup>: This osteopathic test is used to diagnose the dysfunctions of the C3 facet joint, and it was described by Greenman<sup>13</sup>; its validity for the osteopathic diagnosis of dysfunctions in the low cervical segment (C3-C7) is as good as any other radiologic tests.<sup>14</sup>

The patient will be in supine position and the practitioner will be at the head of the table. Practitioner's index and middle fingers of each hand will approach the articular apophysis of the superior vertebra (C3), of the segment that will be examined.

Thenar eminences and practitioner's hand palms control the head and the superior cervical spine of the patient.

To determine if the dysfunction is in flexion, rotation or homolateral bending (FRS), the examiner extends the patient's head until the explored segment, which is in this case C3. This segment is side shifted from right to left, examining the presence of articular resistance. If there is presence of resistance, it means that the mobility restriction is towards the extension, right bending and right rotation (left FRS). When facing this restriction, the right facet joint cannot be closed properly, and it remains in decompression or in a desimbrication state. To finish the test, a side shift from left to right is also performed afterwards. If in this case certain resistance is perceived, mobility restriction is given towards extension, left bending and left rotation (right FRS). In this case, the facet joint of the left side totally rejects to close and remains desimbricated.



Figure 1. Klein's test



Figure 2. Jackson's test



Figure 3. Semidirect Technique for FRS of C3

## INDICATIONS / BENEFITS

Cervicalgias, cervicobraquial neuralgias, headaches, cervical disc protrusions; dizziness; cervical muscle spasms and diaphragmatic alterations, due to the innervation that this muscle receives from the level C3-C4.

## CONTRAINDICATIONS / RISKS

This technique is not recommended in the following cases<sup>15, 16</sup>: traumatism, sequels of non-consolidated fractures, sprains of acute phase of third degree, vertebrobasilar insufficiency and cerebral vascular alterations, neurologic alterations, significant osteoporosis, osteophytosis, congenital malformations, basilar impression, Arnold-Chiari, syringomyelia, patient's rejection to manipulation, tumours, infections and severe rheumatic alterations, congenital osteomalacia, iatrogenic dysplasia (long-term corticoids), rheumatoid arthritis, periarticular ossification, cervical myelopathy, medullar compression, nervous compression (neurological deficit).

## TECHNIQUE DESCRIPTION

This technique<sup>17</sup> consists of applying a lever in homolateral lateroflexion-rotation, and then perform the thrust in lateroflexion to imbricate the C3 facet over C4. We will describe this impulse technique for a right FRS dysfunction.

**Practitioner's position:** The osteopath will be standing in front of the patient's head, with his right leg behind. His right hand will approach the radial-palm side of the interphalangeal joint of the index over the upper edge of the transverse apophysis of C3 vertebra, previously applying a tissue pull from top to bottom; thumb must be resting over the patient's cheek and the free fingers must adapt to the area of the occiput. Osteopath's forearm will be oriented towards the left hip of the patient. His left hand will control the patient's head, with the osteopath's palm over the patient's ear, in such manner that the sternocleidomastoid's centre is between the practitioner's fingers (in the third interdigital area).

**Patient's position:** He/she will be lying in supine position. The osteopath will regulate mobility in cervical flexion-extension, until the movement reaches the C3 vertebral level. Then, we apply a slight cervical rotation to the left (45°), and we also perform a slippage movement from the right side to the left side of the vertebra, apart from a slight right cervical lateroflexion, until the movement reaches at the C3 level. The practitioner must approach his elbows to the trunk now, in order to stabilise his position and transmit safety and confidence to the patient, without losing any of the acquired parameters, since in a different case, the tension acquired in tissues would decrease. Thrust is applied by contracting the right pectoral towards the patient's left hip (figure 3), through an impulse of low-amplitude and high-velocity. If dysfunction occurred on the opposite side, meaning a left FRS, parameters would be inverted and the same technique would be applied towards the opposite side of the one described here previously.

## PRECAUTIONS

Before applying the technique of cervical manipulation, the osteopath must make sure that the diagnosis assessment tests suggest applying this precise procedure, especially a negative result from Klein's test and the imaging tests, and in lack of any morphologic alterations or coexistent pathologies that could contraindicate this therapeutic procedure of manipulating.

Moreover, the necessary movements in order to get the appropriate cervical tension that will obtain an effective manipulation force the osteopath to maintain a stable body position, avoiding painful movements for the patient. The final impulse to apply a thrust must be done in a controlled way<sup>21</sup> with a limited range of motion and high thrust velocity.

## CONCLUSIONS

Semidirect technique at C3 for FRS dysfunctions should be applied in recommended situations, after carrying out first an appropriate diagnostic examination in order to avoid the known associated risks, and always when there are no contraindications.

The osteopath may include this procedure between all his available therapeutic resources for the benefit of his patients.

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### CONFLICTS OF INTEREST

Authors declare there were no conflicts of interest associated with this research.

### REFERENCES

1. Hoover D.O: Dr. Fryettes Spinal Techni, 1948, in Yearbook, Published by the Academy of Applied Osteopathy, California; 1969.
2. Fryette H.H. D.O: Principies of Osteopathic Technic, Academy of Applied Osteopathy, Carmel: California; 1954.
3. Rouvière H, Delmas A. Anatomía Humana. Descriptiva, Topográfica y Funcional. Tomo I. Cabeza y Cuello. 10ª Edición. Barcelona: Edit. Masson; 1999.
4. Kay TM, Gross A, Goldsmith C, Santaguida PL, Hoving J, Bronfort G et al. Exercises for mechanical neck disorders. Cochrane Database Syst Rev. 2005; (3):CD004250.
5. Gross A, Miller J, D'Sylva J, Burnie SJ, Goldsmith CH, Graham N, Haines T, Brønfort G, Hoving JL. Manipulation or Mobilisation for Neck Pain. Cochrane Dat of Syst Rev. 2010; 1: CD004249.
6. Trinh KV, Graham N, Gross AR, Goldsmith CH, Wang E, Cameron ID et al. Acupuncture for neck disorders. Cochrane Dat Syst Rev. 2006; 3:CD004870.
7. Haines T, Gross A, Burnie SJ, Goldsmith CH, Perry L. Patient education for neck pain with or without radiculopathy. Cochrane Dat of Syst Rev. 2009; 1: CD005106.
8. Peloso P, Gross A, Haines T, Trinh K, Goldsmith CH, Burnie S et al Medicinal and injection therapies for mechanical neck disorders. Cochrane Dat Syst Rev. 2007; 3:CD000319.
9. Cleland J. Netter. Exploración clínica en ortopedia 1ª edición. Barcelona: Editorial Masson; 2006.
10. Kapandji I.A. Cuadernos de Fisiología Articular. Tomo III. 2ª Edición. Barcelona: Editorial Masson; 1997.
11. Ricard F. Tratamiento Osteopático de las Algas de Origen Craneo –Cervical. Cervicalgias, tortícolis, neuralgias cervicobraquialgias, cefaleas, migrañas vértigos. 1ª Edición. Madrid; Gráficas Algorán; 2000.
12. Ricard F, Salle JL. Tratado de osteopatía. 2ªedición. Madrid: Mandala ediciones; 1991.
13. Greenman PE . Principios y Práctica de la Medicina Manual, 2ª Edición. Madrid: Editorial Médica Panamericana; 1998.
14. Fernández de las Peñas C, Downey C, Miangolarra-Page JC. Validity of the lateral gliding test as tool for the diagnosis of intervertebral joint dysfunction in the lower cervical spine. J Manipulative Physiol Ther. 2005 Oct; 28 (8): 610-6.
15. Gibbons P, Tehan P. Spinal manipulations: indications, risks and benefits. Journal of Bodywork and Movement Therapies 2001;5(2): 110-19.
16. Di Fabio RP. Manipulation of the cervical spine: Risks and benefits. Physical Therapy 1999; 79 (1):50-65.
17. Ricard F. Tratamiento osteopático de las algias de origen cervical. 1ed. Madrid:Médica Panamericana; 2008.
18. Kierner AC y cols. How do the cervical plexus and the spinal accesory nerve contribute to the innervation of the trapezius muscle. As seen from within using Sihler's stain Arch Otolaryngol Head Neck Surg. 2001 Oct; 127 (10):1230-2.
19. Karuman PM, Soo KC. Motor inervation of the trapezius muscle: a hostoclemlcal study. Head Neck. 1996 May-Jun; 18 (3):254-8.

20. Krause HR y cols. The innervation of the trapezius muscle in connection with radical neck-dissection, An anatomical study. J Craniomaxillofac Surg. 1991 Feb; 19 (2):87-9.

21. Pickar JG. Efectos neurofisiológicos de la manipulación vertebral. Osteopatía Científica. 2011;6(1):2-18

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