

Cervicogenic headache

Normal anatomy



문 정 수

브레인신경과

Contents

- Definition of Cervicogenic headache
- Associated structure
 - Sub-occipital nerve
 - Greater occipital nerve
 - Third occipital nerve
 - Superficial cervical plexus
 - Dorsal scapular nerve
 - Facet joint / Medial branch
 - C4-7 sonographic differences

The International Classification of Headache Disorders,
3rd Edition (ICHD III)

Table 2.—International Classification of Headache Disorders 3rd Edition (ICHD III) – Basic Organization

Part 1: Primary headaches, chapters 1–4 (no other causative disorder)

1. Migraine
2. Tension-type Headache
3. Trigeminal Autonomic Cephalalgias
4. Other primary headaches

Part 2: Secondary headaches

5. Posttraumatic
6. Vascular disease
7. Other intracranial pathology
8. Substances
9. CNS infection
10. Homeostatic disorders
11. Cranium, Neck, Eyes, ENT, Sinuses, Mouth, Teeth, TMJ
12. Psychiatric

Part 3: Cranial Neuralgias and other facial pain

13. Neuralgias and neuropathy

Appendix

The International Classification of Headache Disorders,
3rd Edition (ICHD III)

Table 13.—Cervicogenic Headache 11.2.1

- A. Any headache fulfilling criterion C
- B. Clinical, laboratory and/or imaging evidence of a disorder or lesion within the cervical spine or soft tissues of the neck, known to be able to cause headache
- C. Evidence of causation demonstrated by at least two of the following:
 1. headache has developed in temporal relation to the onset of the cervical disorder or appearance of the lesion
 2. headache has significantly improved or resolved in parallel with improvement in or resolution of the cervical disorder or lesion
 3. cervical range of motion is reduced and headache is made significantly worse by provocative manoeuvres
 4. headache is abolished following diagnostic blockade of a cervical structure or its nerve supply
- D. Not better accounted for by another ICHD-III diagnosis

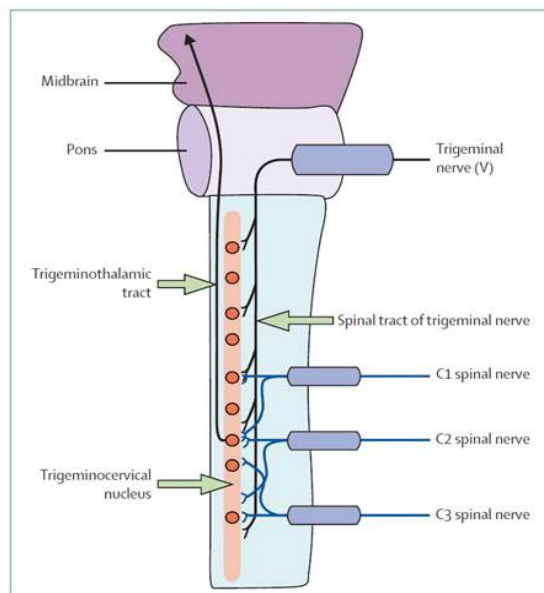


Figure 1: Mechanism of pain referral from the cervical spine to the head
Nociceptive afferents of the trigeminal and upper three cervical spinal nerves converge onto second-order neurons in the trigeminocervical nucleus in the upper cervical spinal cord. This convergence mediates the referral of pain signals from the neck to regions of the head innervated by cervical nerves or the trigeminal nerve.

Lancet Neurol 2009; 8: 959-68

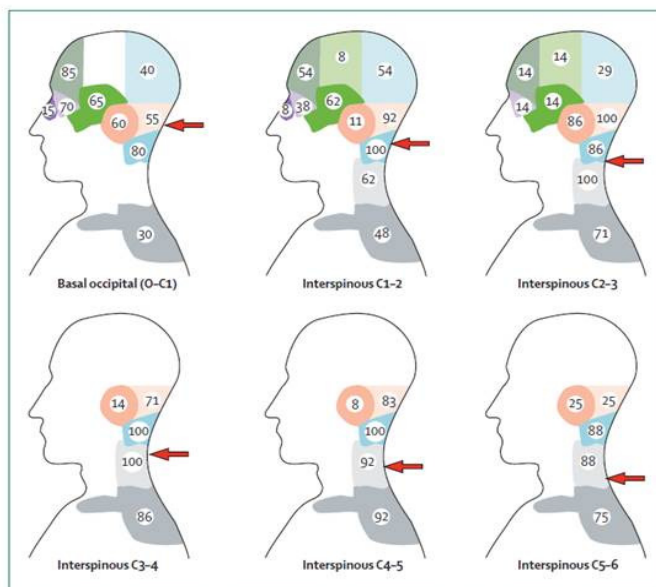


Figure 2: Referred pain patterns after noxious stimulation of basal occipital periosteum and interspinous muscles at C1-2, C2-3, C3-4, C4-5, and C5-6
The more cephalad the site of stimulation, the more likely that pain is referred to distant regions of the head. The numbers indicate the percentage of individuals who reported pain in the area shown after stimulation at each segmental level. The arrows indicate the approximate site of stimulation. Adapted from Campbell and Parsons, with permission from Lippincott Williams & Wilkins.²⁰

Lancet Neurol 2009; 8: 959-68



Upper Cervical Facet Joint and Spinal Rami Blocks for the Treatment of Cervicogenic Headache

Linqiu Zhou, MD; Zarinah Hud-Shakoor, DO; Christopher Hennessey, PA-C; Avi Ashkenazi, MD

Abstract

(*Headache* 2010;50:657-663)

Objective.— To evaluate the efficacy of upper cervical facet joint injections and spinal rami blocks in the treatment of cervicogenic headache.

Background.— Cervicogenic headache has been recognized as a common and often disabling disorder. The treatment of this headache type remains challenging.

Methods.— We conducted a retrospective chart review of 31 patients with refractory cervicogenic headache who underwent fluoroscopically guided C_{1/2}, C_{2/3} facet joint injections and C₂, C₃ spinal rami blocks using a mixture of 0.25% bupivacaine and 3 mg betamethasone. The outcome measures were the change in headache severity, assessed using an 11-point numerical pain scale, after treatment, and the duration of head pain relief.

Results.— Twenty-eight (90.3%) patients experienced >50% headache relief after treatment, with an average duration of 21.7 (1-90) days. Mean (±SD) head pain intensity decreased from 7.5 ± 1.3 before treatment to 2.7 ± 1.9 immediately after it ($P < .0001$). The procedures were well tolerated.

Conclusions.— C_{1/2}, C_{2/3} facet joint injections and C₂, C₃ spinal rami blocks were effective and well tolerated for the treatment of cervicogenic headache in this study. The procedures provided significant and prolonged pain relief in the majority of patients. Larger controlled studies are needed to further evaluate the efficacy of this treatment modality in cervicogenic headache.

Response of Cervicogenic Headaches and Occipital Neuralgia to Radiofrequency Ablation of the C2 Dorsal Root Ganglion and/or Third Occipital Nerve

Volume 54, Issue 3
March 2014
Pages 500-510

Abstract

Objective

This article investigates the degree and duration of pain relief from cervicogenic headaches or occipital neuralgia following treatment with radiofrequency ablation of the C2 dorsal root ganglion and/or third occipital nerves. It also addresses the procedure's complication rate and patient's willingness to repeat the procedure if severe symptoms recur.

Methods

This is a single-center retrospective observational study of 40 patients with refractory cervicogenic headaches and/or occipital neuralgia. Patients were all referred by a headache specialty clinic for evaluation for radiofrequency ablation of the C2 dorsal root ganglion and/or third occipital nerves. After treatment, patients were followed for a minimum of 6 months to a year. Patient demographics and the results of radiofrequency ablation were recorded on the same day, after 3-4 days, and at 6 months to 1 year following treatment.

Results

Thirty-five percent of patients reported 100% pain relief and 70% reported 80% or greater pain relief. The mean duration of improvement is 22.35 weeks. Complication rate was 12-13%. 92.5% of patients reported they would undergo the procedure again if severe symptoms returned.

Conclusions

Radiofrequency ablation of the C2 dorsal root ganglion and/or third occipital nerve can provide many months of greater than 50% pain relief in the vast majority of recipients with an expected length of symptom improvement of 5-6 months.

Treatment of Cluster Headache: The American Headache Society Evidence-Based Guidelines

Results and Recommendations.—For acute treatment, sumatriptan subcutaneous, zolmitriptan nasal spray, and high flow oxygen remain the treatments with a Level A recommendation. Since the 2010 review, a study of sphenopalatine ganglion stimulation was added to the current guideline and has been administered a Level B recommendation for acute treatment. For prophylactic therapy, previously there were no treatments that were administered a Level A recommendation. For the current guidelines, suboccipital steroid injections have emerged as the only treatment to receive a Level A recommendation (per 2010 guideline).

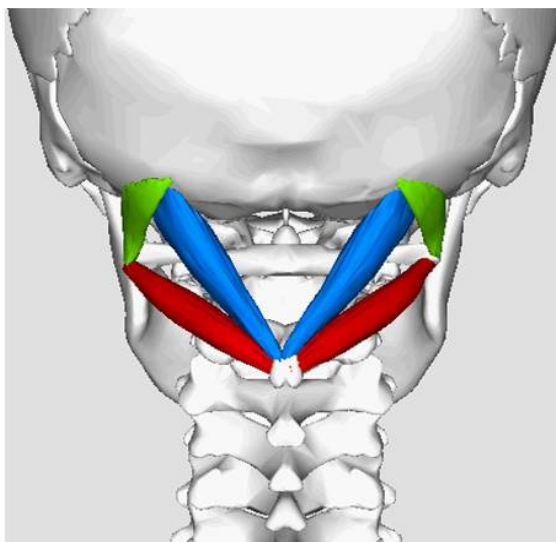
Table 2.—Efficacy, Adverse Events, Level of Evidence and Recommendations for the Prophylactic Therapy of Cluster Headache

Treatment	Study Population	Efficacy	Adverse Events	Level of Evidence	Recommendation
Positive evidence Suboccipital steroid injection*	Episodic and chronic CH	Suboccipital single injection or injection series with corticosteroids is effective in reducing attack frequency†	Nonserious: transient injection site pain, headache	Two class I randomized, controlled trials	Level A: established as effective

(*Headache* 2016;56:1093-1106)

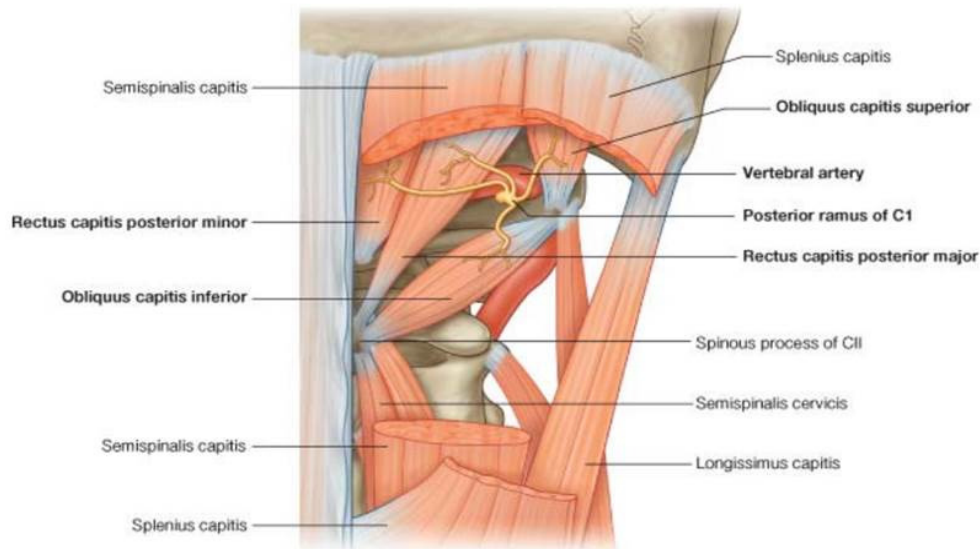
- Posterior Rectus capitis
- Superior oblique capitis
- Inferior oblique capitis

- 3rd part of vertebral artery
- Suboccipital nerve
- Suboccipital venous plexus



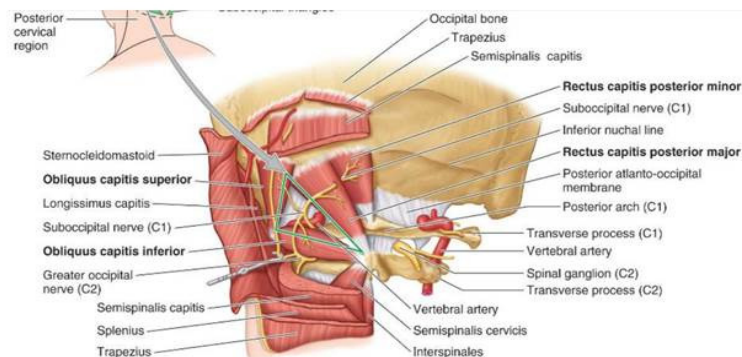
• Suboccipital nerve (=dorsal ramus of C1)

- Innervate the atlanto-occipital joint
- Potential source for occipital regional pain



• C2 spinal nerve & its dorsal root ggl

- Innervate C1-2 and C2-3 facet joint
- Neuralgia of C2
- Ipsilateral conjunctival injection and lacrimation
- Arterial or venous compression cause neuralgia



• Greater occipital nerve(dorsal ramus of C2)

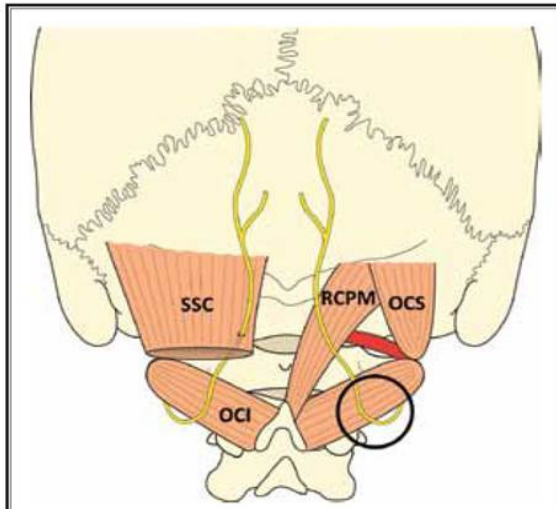
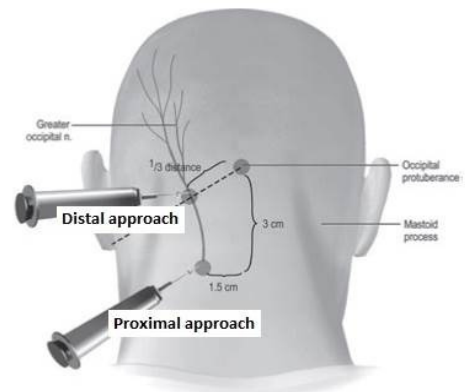
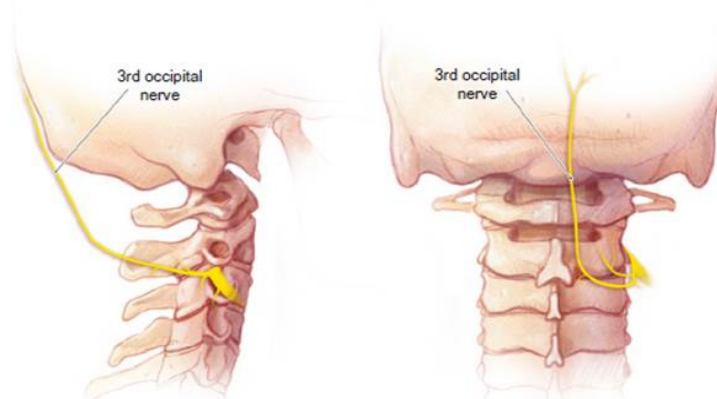


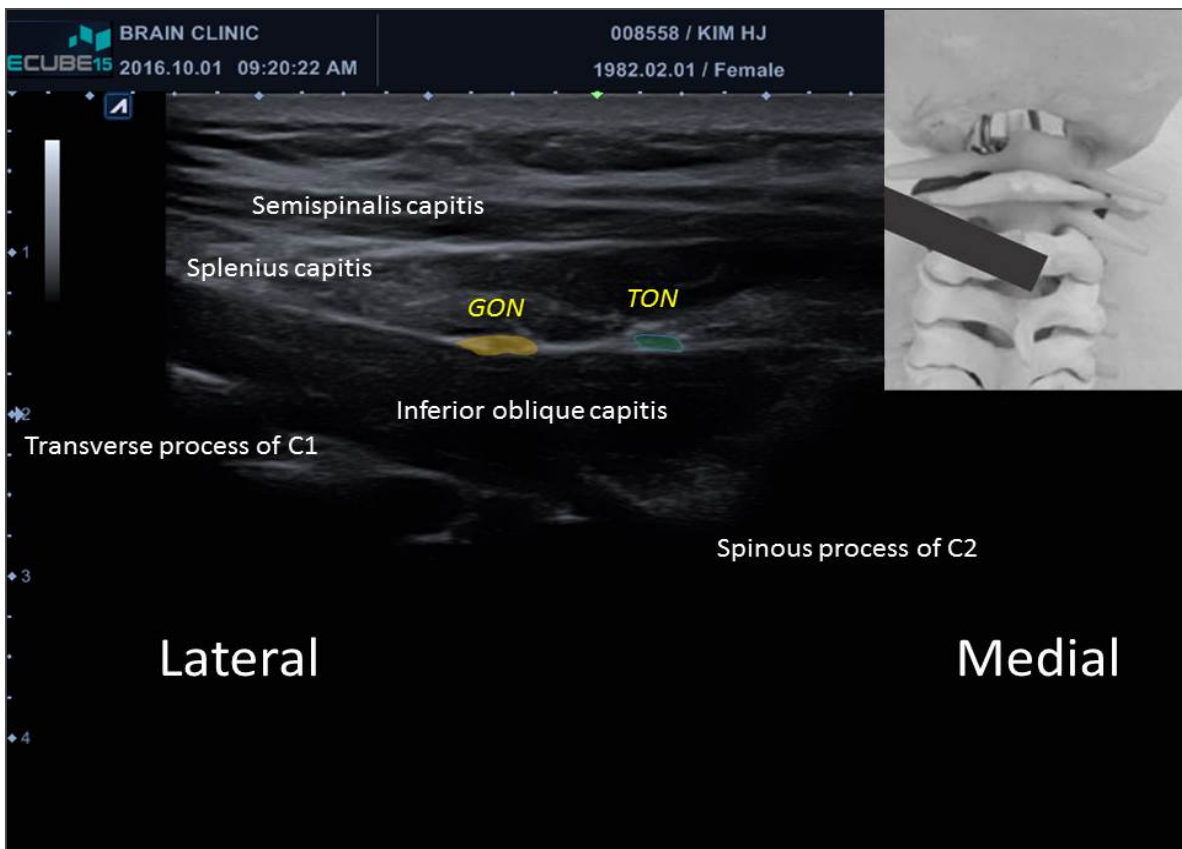
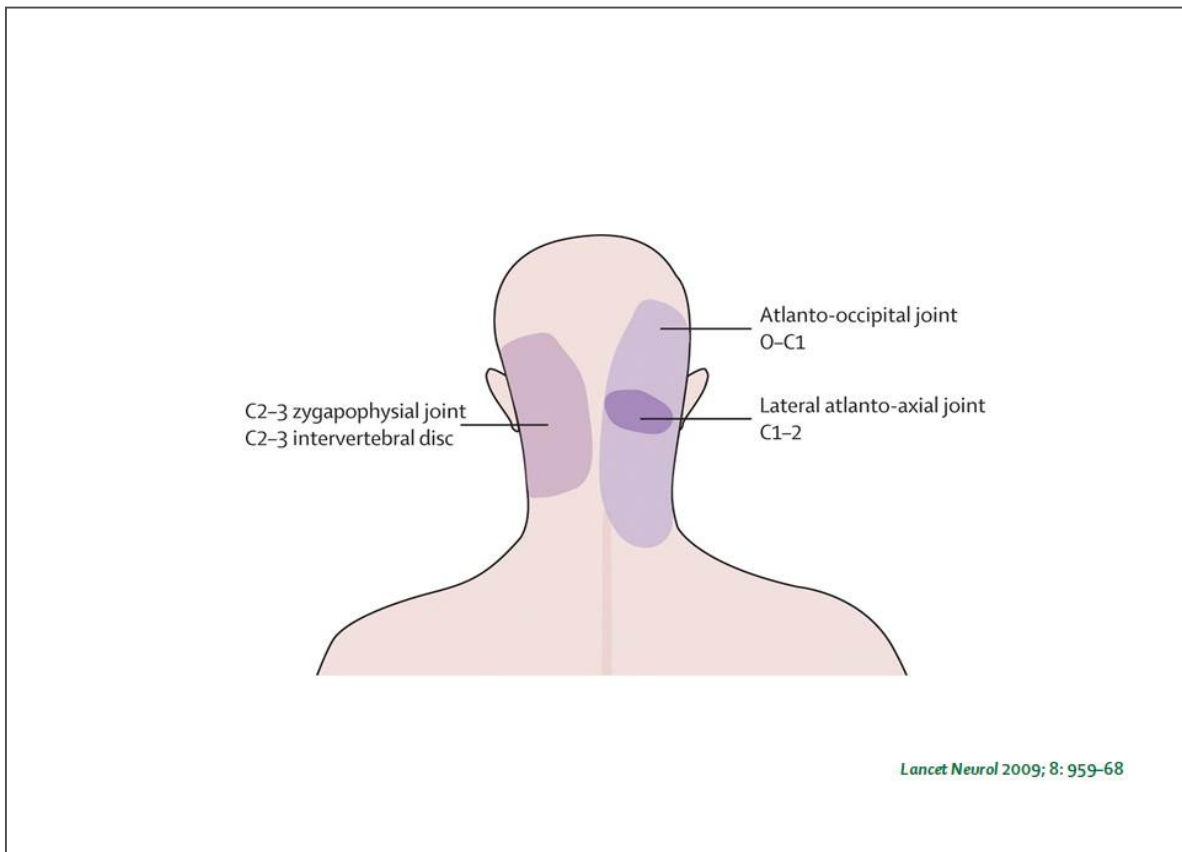
Fig. 1. Anatomical schematic view of the GON.
Notes: SSC: semi-spinalis muscle. OCI: obliquus capitis inferior muscle. OCS: obliquus capitis superior muscle. RCPM: rectus capitis posterior major muscle. Yellow structure: GON. Red structure: vertebral artery. Black circle: target site of the infiltration of the GON



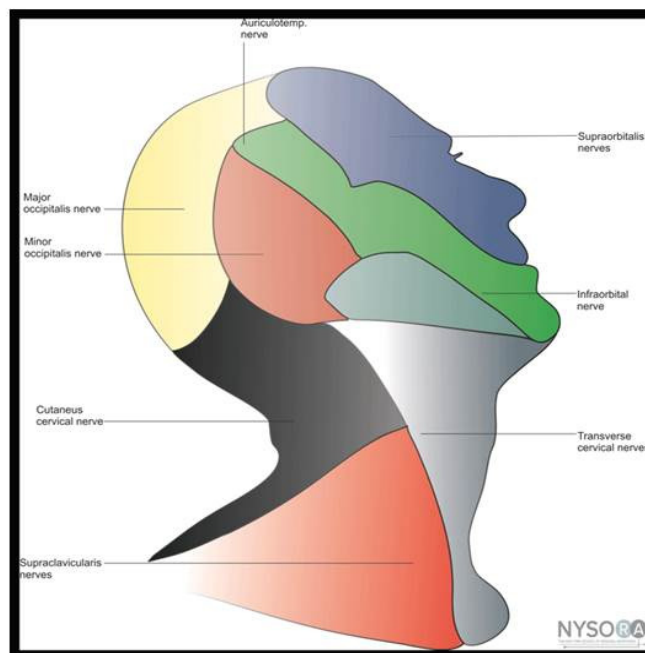
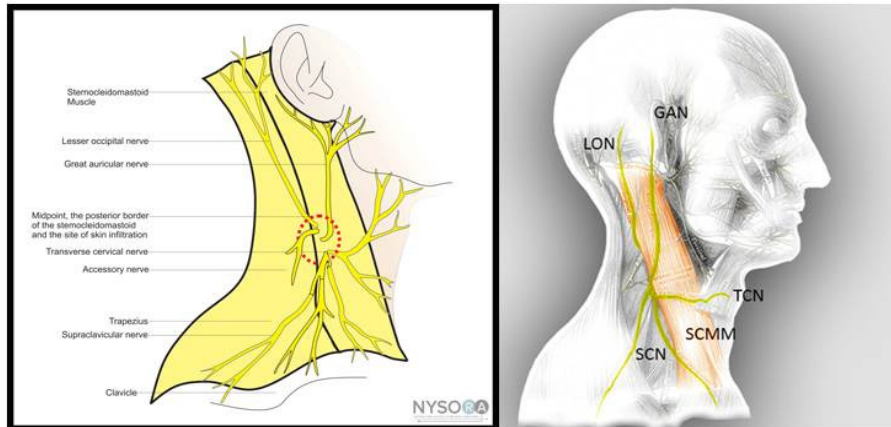
• Third occipital nerve (dorsal ramus of C3)

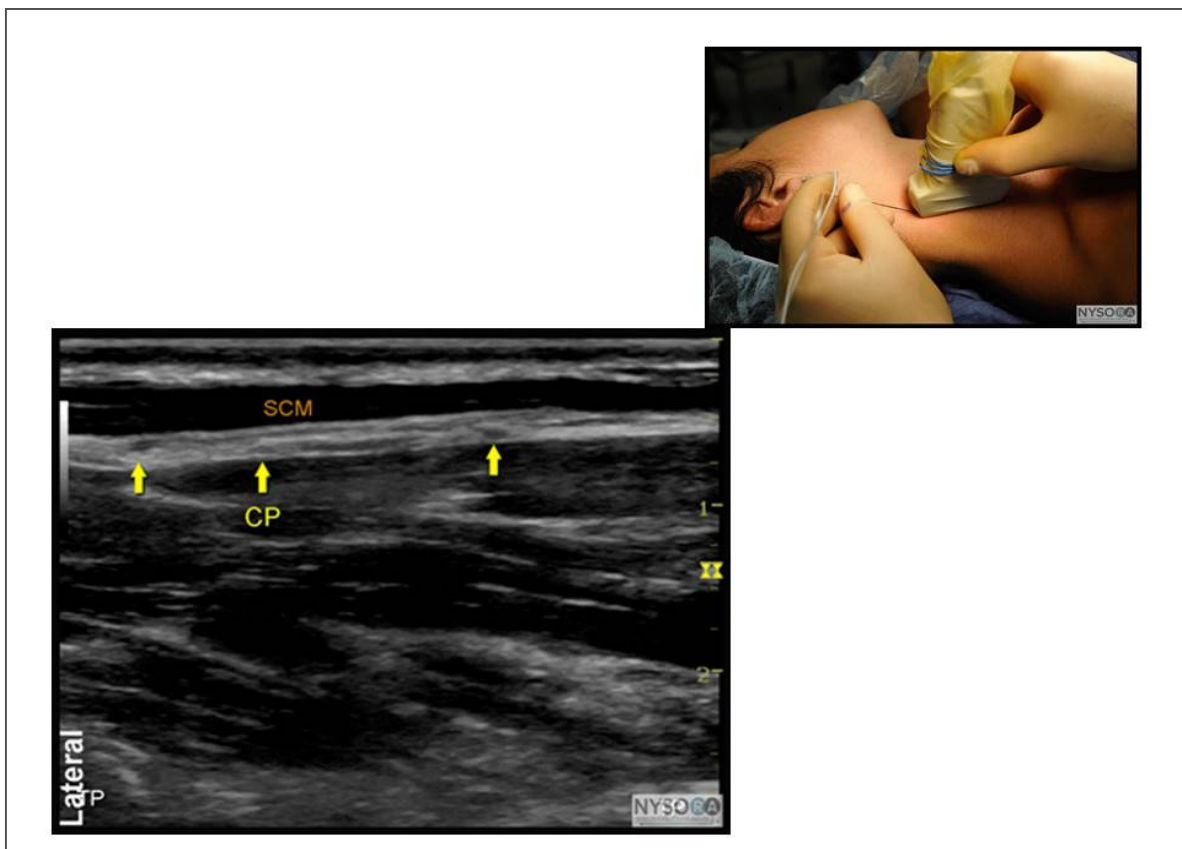
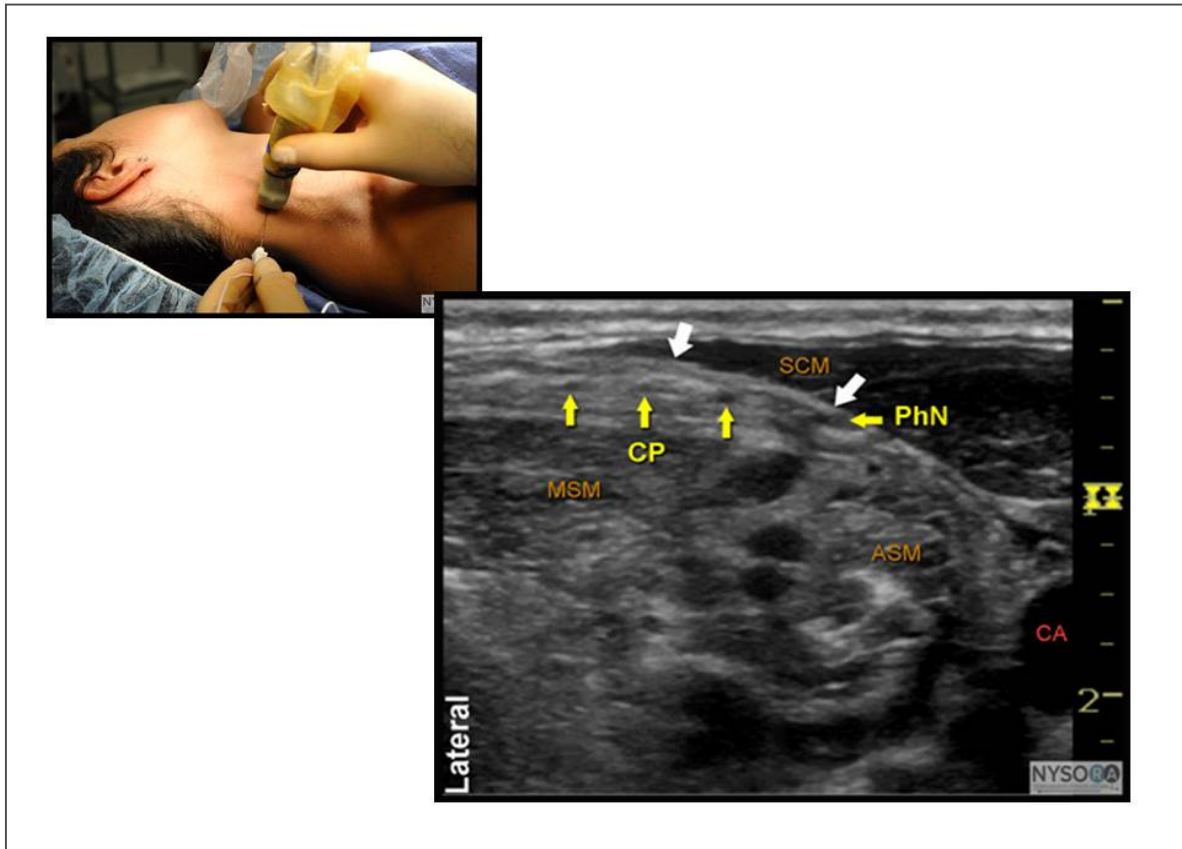
- Innervate C2-3 facet joint
- Most vulnerable to trauma from whiplash injury

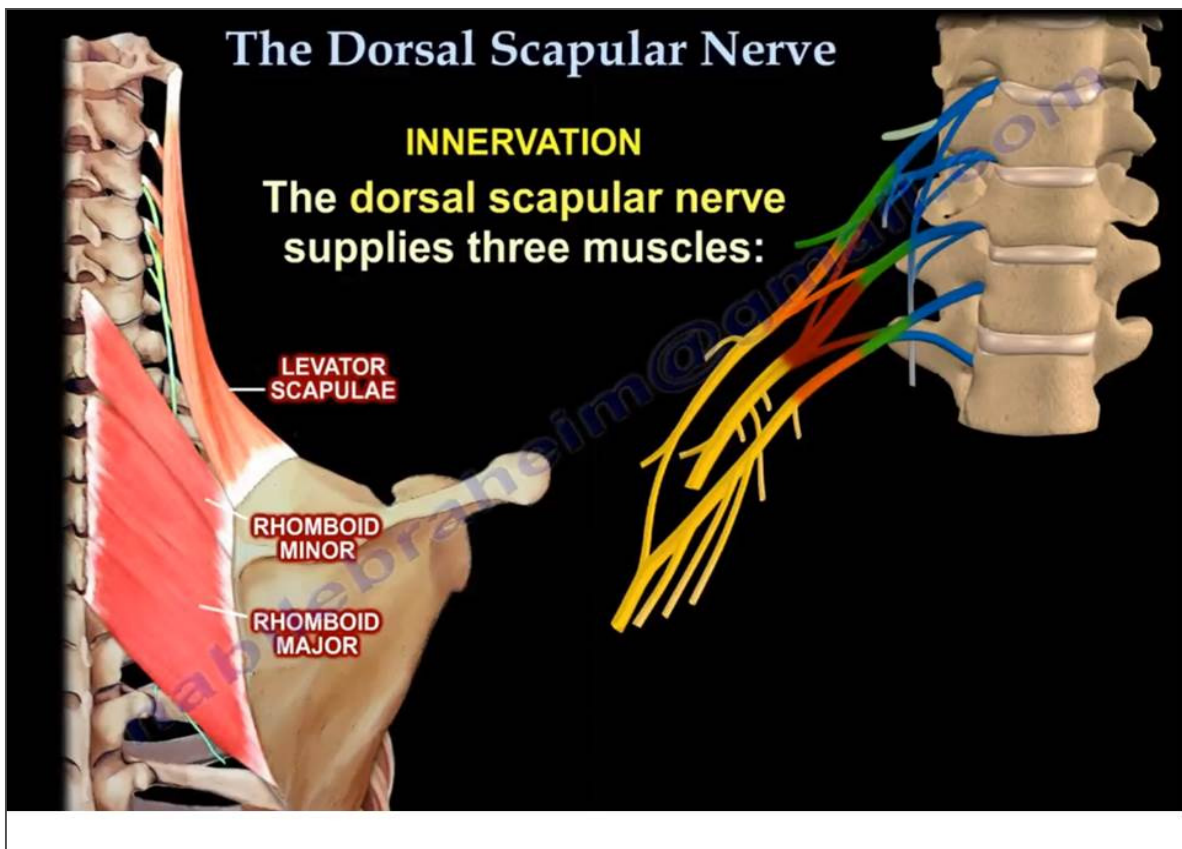
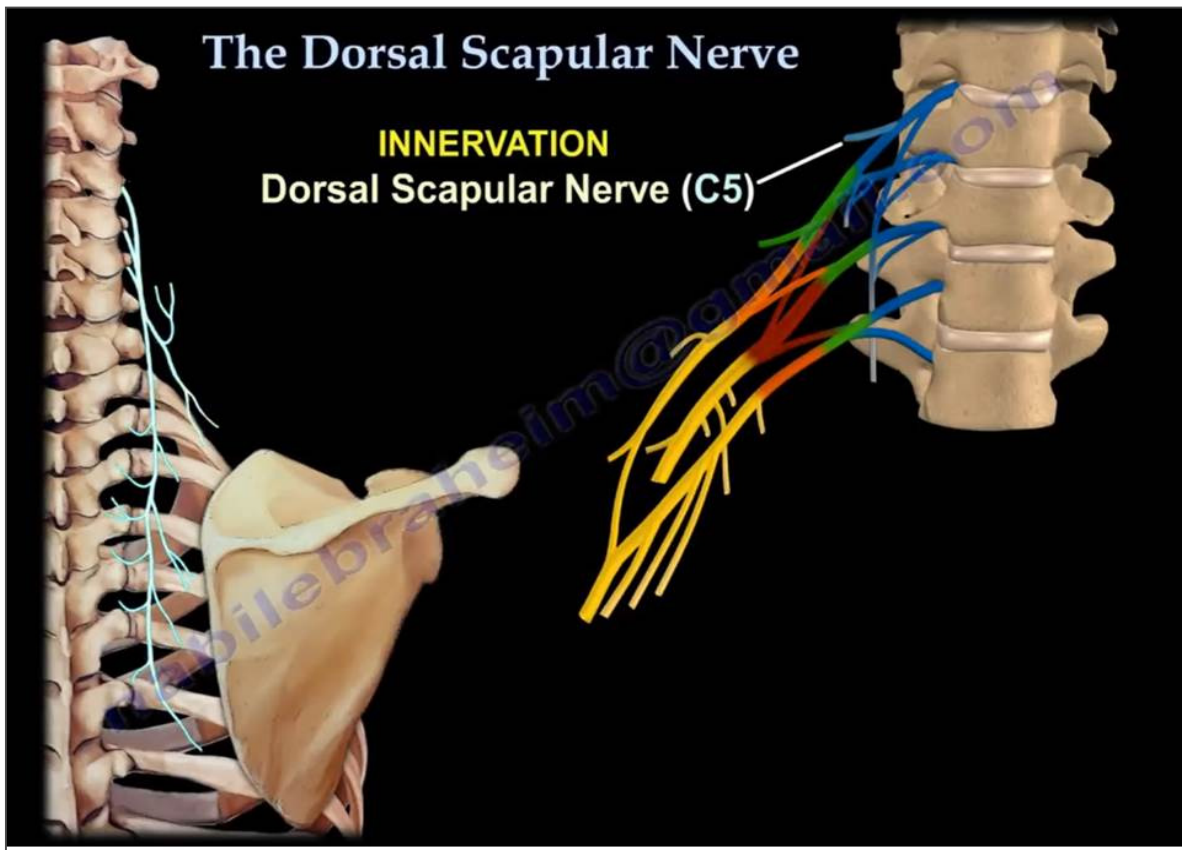


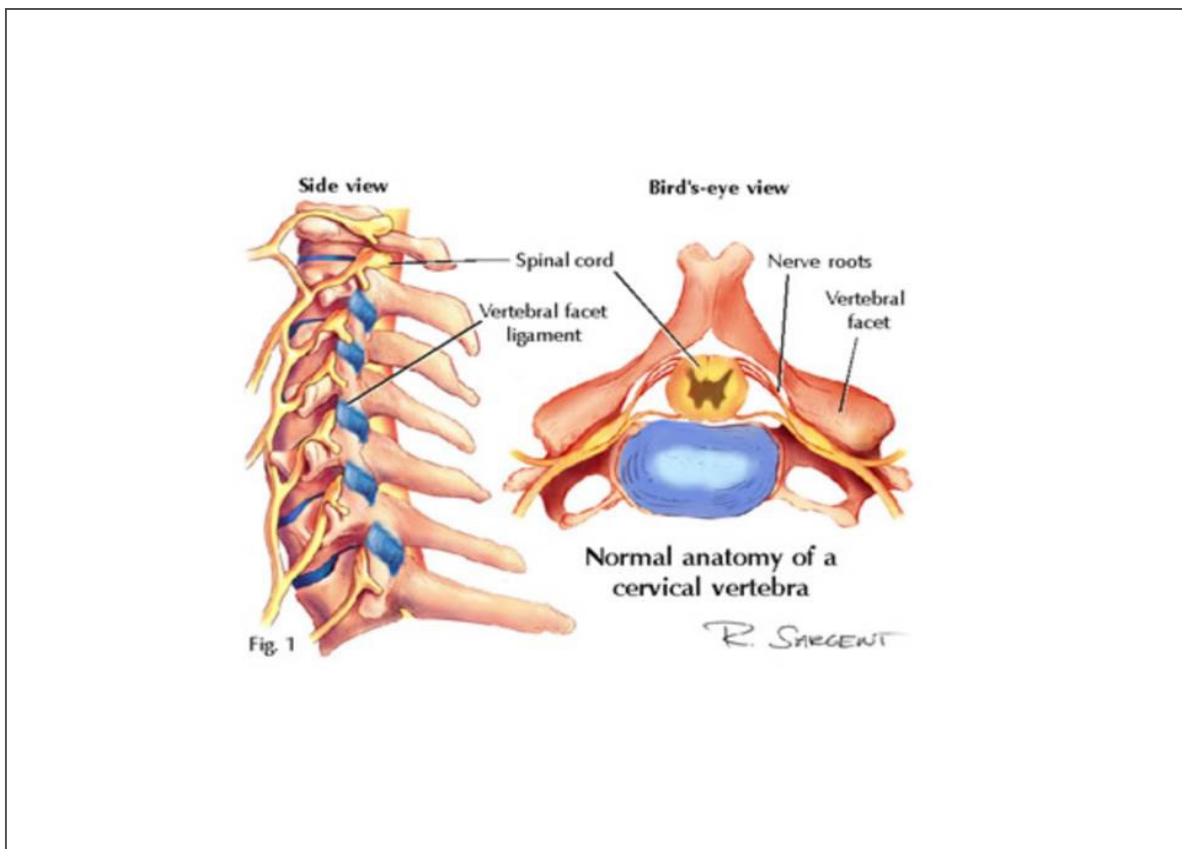
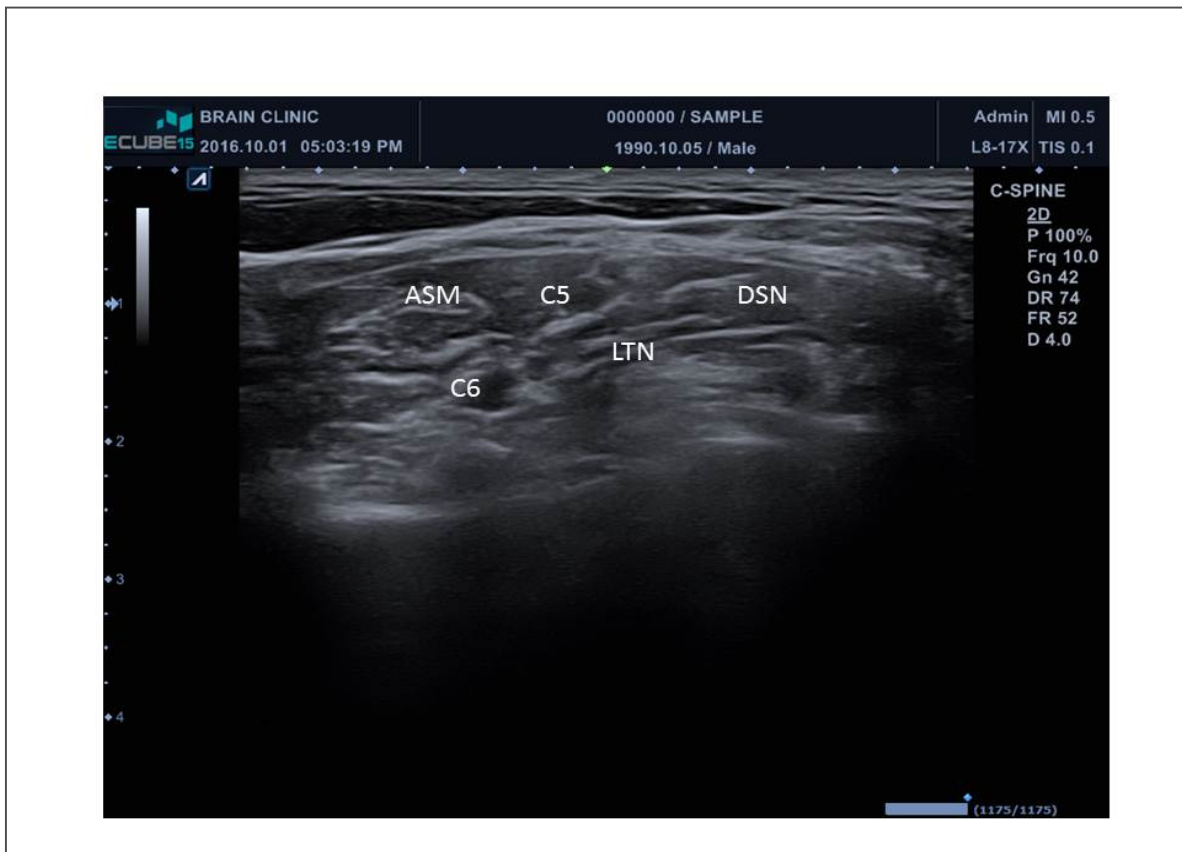


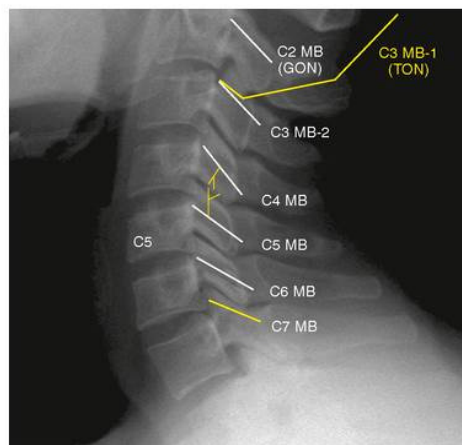
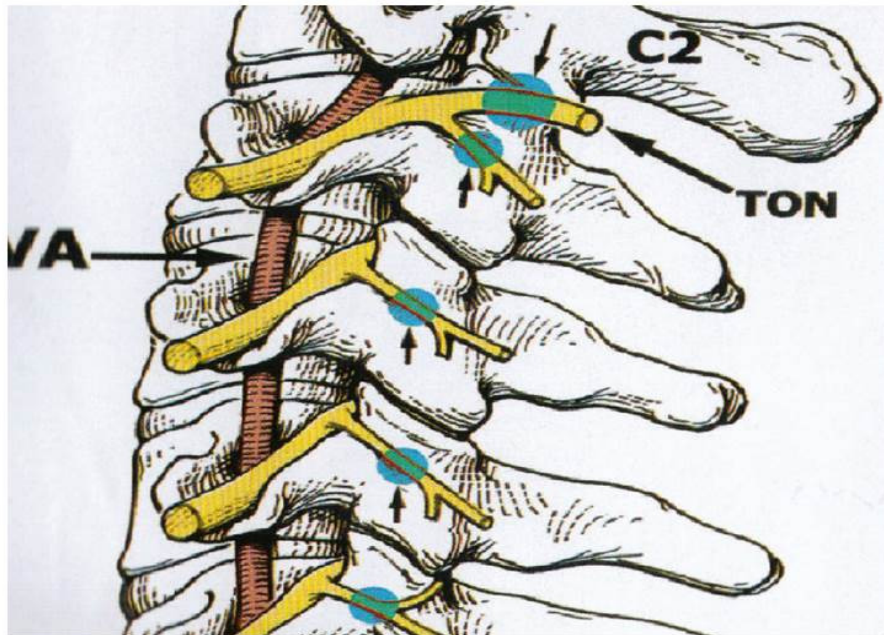
• Superficial cervical plexus











Lateral radiograph of the cervical dorsal rami. The third occipital nerve (TON) crosses the inferior pole of the C2-C3 zygapophyseal joint, running close to the C3 deep medial branch (C3 MB-2). The C4 through C6 medial branches course around the waists of the articular pillars. The C7 medial branch crosses the root of the C7 transverse process and therefore lies higher on the lateral projection of the C7 articular pillar. GON, greater occipital nerve.

Cervical Zygapophysial Joint Pain Maps

Grant Cooper, MD,* Beverly Bailey, RN,[†] and Nikolai Bogduk, MD[†]

*Department of Rehabilitation Medicine, New York-Presbyterian Hospital, The University Hospital of Columbia and Cornell, New York, New York, USA; [†]Department of Clinical Research, University of Newcastle, Royal Newcastle Hospital, Newcastle, New South Wales, Australia

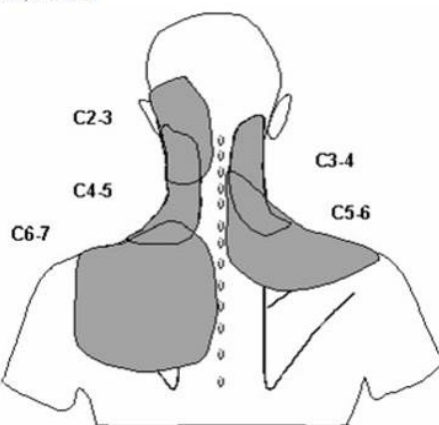


Figure 1 The patterns of referred pain from the cervical zygapophysial joints produced experimentally in normal volunteers (based on Dwyer et al. [8]).

PAIN MEDICINE
Volume 8 • Number 4 • 2007

LEFT						RIGHT					
C6-7	C5-6	C4-5	C3-4	C2-3	C1-2	C1-2	C2-3	C3-4	C4-5	C5-6	C6-7
14	28	4	5	30	3	3	37	5	2	38	17

Figure 3 The prevalence of joints symptomatic at particular segments, alone, bilaterally, or in various combinations, in 194 patients, of whom 134 had at least one symptomatic joint. Single boxes indicate a single symptomatic joint on either side. Contiguous boxes indicate symptomatic joints at consecutive segments on the same side. Bars linking boxes indicate symptomatic joints at displaced segments or bilaterally in the same patient. The numbers in the boxes indicate the number of patients who exhibited the particular distribution of symptomatic joints indicated by the boxes. The total number of joints symptomatic at particular segments, on each side, irrespective of combinations, is shown at the bottom of the figure.

PAIN MEDICINE
Volume 8 • Number 4 • 2007

