

#### INSTRUCTIONS FOR LETTERS TO THE EDITOR

Editorial comment in the form of a Letter to the Editor is invited. The length of a letter should not exceed 800 words, with a maximum of 10 references and no more than 2 figures or tables; and no subdivision for an abstract, methods, or results. Letters should have no more than 4 authors. Financial associations or other possible conflicts of interest should be disclosed.

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# Techniques for "Blind" Glucocorticosteroid Injections into Glenohumeral Joints

To the Editor:

Corticosteroid injections into glenohumeral joints have long been a valuable adjunct therapy in managing selected patients with localized persistent pain usually accompanied by decreased range of motion (ROM). Such local injections are performed by rheumatologists<sup>1</sup>, orthopedic surgeons<sup>2</sup>, and other physicians<sup>3</sup>. The accuracy of intraarticular injections into shoulder<sup>1-3</sup> or other<sup>1,4</sup> joints has been emphasized for achieving optimal patient comfort and therapeutic benefit<sup>1-7</sup>.

In a recent article in *The Journal*<sup>6</sup>, a study reporting a low 42% accuracy of glenohumeral injections confirmed by radiographic contrast dye<sup>8</sup> was cited. That cadaveric study<sup>6</sup> evaluated positional and bony landmark techniques to improve subacromial and glenohumeral injection accuracy and to limit dye dispersal, without radiologic or fluoroscopic imaging assistance, i.e., using "blind" clinical techniques. Another recent cadaveric study<sup>7</sup> indicated greater (p = 0.04) accuracy of an anterior [16 of 20 (80%)] than posterior [10 of 20 (50%)] shoulder approach. In that study<sup>7</sup>, accuracy was determined fluoroscopically, after injecting contrast dye. A recent letter<sup>9</sup> described conflicting reports of anterior glenohumeral injection accuracy given at the 2006 Annual Meeting of the New England Shoulder and Elbow Society (Jay Peak, VT, USA; January 28-29, 2006), from low (Dr. Patel) to excellent results (Dr. K. Shea).

Considering current concerns and controversy about "blind" shoulder injection techniques, selected aspects of our procedures are summarized (Table 1) that reflect over 100 person-years' experience<sup>1,5</sup>. The estimated therapeutic injection success rates are based upon patients' reported postinjection decrease in symptoms, improved shoulder ROM measurements, and followup evaluations. However, anatomical accuracy of injection placement was not confirmed using contrast radiography<sup>6,7,9</sup>. Such imaging procedures were not considered necessary in achieving our desired satisfactory clinical results. Reliable performance of this common steroid injection is expected in clinical practice, provided that sufficient instruction in anatomical landmarks and procedural experience have been acquired<sup>1,5,6</sup>. When injecting via the anterior approach, our needle entry site is immediately lateral to the deeply palpated anterolateral edge of the

coracoid process<sup>2,7</sup> (Table 1), not at 1 cm lateral to the coracoid, as described<sup>3</sup>. The site is on a palpable "groove" between the coracoid process and the humeral head. It is also important to gently penetrate the soft tissues with a thin 1.5-in needle, avoiding bony contact or increased resistance, until the hub of the needle presses against the skin and a sensation of "popping" through the anterior capsule is noted<sup>2,7</sup> (Table 1). Such technique achieves sufficient depth of injection in almost all adult patients.

Debate on adverse consequences of inaccurate glenohumeral steroid injections may be mitigated by the very nature of the instilled steroid agents. Inaccurate instillation of steroids into paraarticular nontendinous soft tissues may not be harmful, and may still confer benefit to the patient<sup>2,9</sup>. Instillation may not need to be entirely and accurately placed within the shoulder joint cavity to achieve clinical benefits. In the future, however, hyaluronan products likely will be injected into shoulder joints for osteoarthritis-related persistent pain and loss of motion<sup>10,11</sup>. Such injections will likely require refined techniques with strict criteria for accuracy of needle placement and instillations<sup>9</sup>. Paraarticular infiltration with hyaluronan may cause discomfort and "after-pain" or possibly an "inflammatory (pain)" reaction<sup>9,12</sup> that is less likely to confer benefit. Ultrasound, radiographic, or fluoroscopic guidance may deserve consideration with hyaluronan shoulder injections, but did not appear needed in a large-scale controlled study<sup>10,11</sup>.

The recent *Journal* article<sup>6</sup> further signals that accuracy of shoulder joint injections should be a key consideration for clinicians and investigators alike. Anatomical and positional factors should be optimized to achieve accuracy of glenohumeral injections and maximal patient comfort, with either anterior or posterior approaches<sup>1-8</sup> (Table 1). Additional objective data are needed in order to achieve clinical accuracy and efficacy of steroid therapy<sup>1-8</sup> and expected future hyaluronan<sup>9-11</sup> shoulder injections. Our comments do not address issues of clinical indications, cost-effectiveness, or side effects of shoulder joint injection therapy, which also require further investigation.

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Table 1. Summary of corticosteroid injection techniques into glenohumeral joints.

| Aspects of Injection Techniques             | RPD (Orthopedist)                      | ATM (Rheumatologist)                                | DHN (Rheumatologist)   | MBY (Rheumatologist)                          |
|---|--|---|--|---|
| Approaches to injection                     | Posterior                              | Anterior  | Anterior or posterior  | Anterior                                      |
| Allay patient tension and anxiety           | Important                              | Most important                                      | Very important   | Most important                                |
| Positioning to "open" joint space           | Sitting, affected limb hanging relaxed | Semi-inclined, arms relaxed in the lap              | For posterior: adduct hand to opposite shoulder              | Semi-inclined, arms relaxed at the sides      |
| Bony landmarks for injection <sup>1,7</sup> | As described                           | As described, important to palpate for "groove"     | Humeral head and coracoid process                            | As described                                  |
| Local skin anesthesia (wheal)               | No, not needed                         | 1% lidocaine,<br>31 gauge, ½" needle                | Yes, 1% lidocaine<br>25-26 gauge, 5/8" or 7/8" needle        | 1 or 2% lidocaine,<br>27 gauge, 1 ½" needle   |
| Intra-articular needle size                 | 22-gauge, 3 ½"                         | 27-gauge, 1 ½" (caution, not to angulate or bend)   | 22 or 20 gauge, 1½-2" needle                                 | 23-gauge, 1 ½"                                |
| Anesthetic in guiding syringe               | As needed, infrequently                | Routinely, then changed to "mix" syringe, to inject | No, injected through cutaneous wheal                         | Use about ½ cc, before injection of the mix   |
| Necessity of a "second" pass                | Minimal adjustments                    | Less than ¼ of times                                | Rarely need to change angle                                  | About 15%                                     |
| Anesthetic mix in the injection             | 4 ml of 0.25%<br>Marcaine in mix       | 5 ml of 1% Xylocaine mixed with the steroid         | Rarely, as a "therapeutic test", if a patient has great pain | 0.5 ml of 2% Xylocaine mixed with the steroid |
| Depo-Medrol® equivalents                    | 40-80 mg equivalent                    | 30-40 mg equivalent                                 | 40 mg (1ml) to 80 mg (2 ml)                                  | 30-40 mg equivalent                           |
| Degree of injection discomfort              | Minimal                                | Typically minimal (patients often so remark)        | Caution as to rare post-<br>injection reaction               | About 10% indicate moderate discomfort        |
| Pain decreased after injection              | Rapid, within minutes                  | Usually within minutes                              | Frequently prompt relief                                     | Usually in 5-10 min.                          |
| Increase in measurable ROM                  | Documented in follow ups               | Uniformly documented                                | Increase of ROM is variable, follow ROM active exercise      | Almost always                                 |
| Recorded injection complications            | None                                   | None documented                                     | Caution about rare "after pain"                              | None  |
| Associated subacromial injections           | Rarely                                 | Most often indicated                                | Adjacent injections when indicated                           | Required in majority                          |
| Estimated "success" of injection            | Essentially 100%                       | Essentially 100%                                    | 75-80% good response   | Estimated at 95%                              |

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### Mr. Hanchard replies

To the Editor:

The letter from Masi, et al provides interesting insights on developments and practice in this area. Their summary of their "100 person-years' experience" is thought-provoking. However, more information on their methods, presumably retrospective, of data collection and analysis is required to assess the validity of their findings. The reported absence of adverse events ("reported injection complications") and their informally-estimated blind injection "success" rates should therefore be viewed with caution. With regard to these high "success" rates, 3 aspects are of particular note. First, the doses of steroid injected varied from 30 to 80 mg Depo-Medrol® equivalent. (It is unclear whether steroid concurrently targeted at the subacromi-

al bursa was additional to this.) At the higher dosages in particular, the possibility of systemic steroid effects means that interpretation of injection "success" as an indicator of injection accuracy is tenuous. Second, disagreement among the authors as to the incidence of concurrent subacromial bursitis (the perceived need for concurrent bursal injection varied from "rarely" to "required in majority") typifies the diagnostic difficulties that confound evaluations of injection efficacy. Third, since glenohumeral "capsulitis" tends to recover spontaneously, attribution of improvement to any uncontrolled intervention is particularly insecure. As Masi, *et al* imply, further research in this area is required. Like Dr. Sethi, in response to a recent letter by Masi, *et al*<sup>2</sup>, I look forward to the "additional objective scientific data [obtained] with appropriate methodology" that will enable progress in this area.

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