THE SWALLOW-TAIL SIGN: A TEST OF DELTOID FUNCTION

NAOKI NISHIJIMA, TAKAO YAMAMURO, KEIJI FUJIO, MAO OHBA

In extension of the shoulder, latissimus dorsi, triceps (long head), teres major, infraspinatus and trapezius all have some role to play. To extend the shoulder fully, however, like a swallow-tail (Fig. 1), the posterior fibres of deltoid are essential. We have studied the usefulness of this test in diagnosis and assessment of recovery from axillary nerve paralysis.

Patients and method. We evaluated the preoperative state of the shoulder in nine patients with accessory nerve injury, four with rotator-cuff rupture, four with suprascapular nerve injury and ten with axillary nerve injury. Patients with adhesive capsulitis were excluded.

Each patient was asked to extend both shoulders fully in a swallow-tail position. The examiner watched from the side and compared the extension of the shoulder on the affected side with that on the normal side. The diagnosis in each case was confirmed at operation.

The full shoulder-extension test was also used to assess

the prognosis in six patients treated conservatively for axillary nerve paralysis.

Results. Patients with palsy of the accessory nerve, rotator-cuff rupture or palsy of the suprascapular nerve were able to extend the shoulder fully when the axillary nerve was intact (Table I). None of those with axillary nerve palsy was able to extend the shoulder fully (Fig. 2). As the palsy recovered after axillary nerve reconstruction, they regained the capacity of full extension.

In the six patients treated for axillary nerve paralysis without operation, conservative management was continued provided that extension continued to increase. All obtained full functional recovery.

Our findings suggest that the posterior fibres of the deltoid are essential for full extension of the shoulder. The swallow-tail sign is therefore pathognomonic of axillary nerve palsy.

Discussion. Narakas (1991) reported "One function that

Fig. 1

Fig. 2

N. Nishijima, MD, DMSc, Associate Professor
T. Yamamuro, MD, DMSc, Professor and Chairman
K. Fujio, MD, Orthopaedic Surgeon
M. Ohba, MD, Orthopaedic Surgeon
Department of Orthopaedic Surgery, Faculty of Medicine, Kyoto University, 54 Shogoin Kawaharacho, Sakyo-ku, Kyoto 606, Japan.

Correspondence to Dr N. Nishijima at 9-21 Yoshida, Konoe-cho, Sakyo-ku, Kyoto 606, Japan.

©1995 British Editorial Society of Bone and Joint Surgery
0301-620X/95/1R26 \$2.00

J Bone Joint Surg [Br] 1995;77-B:152-3.

Received 11 February 1994; Accepted 13 April 1994

cannot be compensated for is posterior projection of the humerus, particularly that which is dorsal to the plane of the blade of the scapula. This is the function carried out specifically by the posterior deltoid". This observation has not, however, been applied clinically.

The differential diagnosis between rotator-cuff rupture and axillary nerve injury is not always easy and it is difficult to determine the cause of deltoid wasting (Fig. 2). The swallow-tail sign implies that part of the deltoid can function without an intact cuff.

Table 1. Active range of motion of the shoulder (degrees; mean $\pm$ SD)

	Number of cases	Extension		Abduction	
		Affected shoulder	Normal shoulder	Affected shoulder	Normal shoulder
Accessory nerve palsy	9	55.0 $\pm$ 6.6	57.8 $\pm$ 5.7	84.4 $\pm$ 18.3	173.3 $\pm$ 7.1
Rotator-cuff rupture	4	53.8 $\pm$ 4.8	56.3 $\pm$ 4.8	95.0 $\pm$ 37.7	175.0 $\pm$ 5.8
Suprascapular nerve palsy	4	52.5 $\pm$ 6.5	55.0 $\pm$ 5.8	162.5 $\pm$ 9.6	172.5 $\pm$ 5.0
Axillary nerve palsy	10	17.0 $\pm$ 3.5	59.0 $\pm$ 6.6	119.0 $\pm$ 42.1	175.0 $\pm$ 5.2

During recovery from axillary nerve palsy, deltoid function returns first to the posterior fibres because of the anatomical course of the nerve. As the posterior deltoid becomes functional, the shoulder can be extended more, indicating progress. Injury to both the axillary and the suprascapular nerves is often seen, and initially, such a patient is unable to flex, abduct, or externally rotate his shoulder. Suprascapular nerve injuries often recover spontaneously, and these three functions gradually return even if the axillary nerve is ruptured. This may lead to misdiagnosis and failure to repair the axillary nerve at the

optimal time. Inability to extend the shoulder fully suggests that the deltoid has not recovered; the full recovery of extension indicates spontaneous recovery of the axillary nerve.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCE

Narakas AO. Compression and traction neuropathies about the shoulder and arm. In: Gelberman RH, ed. *Operative nerve repair and reconstruction*. Vol. 2. Philadelphia, etc: J.B. Lippincott Company, 1991:1148-75.

STRESS FRACTURE OF THE ACROMION: AN UNUSUAL MECHANISM AND REVIEW OF THE LITERATURE

RICHARD J. HALL, PAUL T. CALVERT

Fractures of the scapula are uncommon. They constitute 3% to 5% of shoulder fractures (Zuckerman, Koval and Cuomo 1993) and are normally the result of considerable force. In 80% to 95% of cases there is an average of 3.9 additional injuries (Goss 1992).

Stress fractures are even rarer. They have been previously described in the body of the scapula, the acromion (Rask and Steinberg 1978; Schils et al 1990), the superomedial corner (Veluvolu et al 1988), the lateral border (Brower, Neff and Tillema 1977) and the coracoid process (Boyer 1975). We describe a stress fracture of the spine of the scapula at the base of the acromion and discuss the mechanism of injury.

Case report. A 42-year-old right-handed woman presented with a 15-day history of left shoulder pain which had begun

while playing golf. As she hit the ball off the tee, she felt sudden pain and heard a crunch from the posterior aspect of her left shoulder. She was unable to play on. There was no history of previous injury to the left shoulder, and nothing to suggest a metabolic bone disorder.

Examination revealed mild swelling with localised tenderness over the spine of the left scapula. Internal rotation was reduced so that her hand could reach only to the level of L1; elevation required assistance and was limited to 160° by pain. External rotation was full.

Radiography revealed an undisplaced linear fracture at the base of the acromion extending into the spine of the scapula (Fig. 1). A full blood count, ESR, and a biochemical screen were normal. Bone densitometry was also normal and showed no evidence of osteopenia.

The patient was given a sling to support the arm, analgesia, and advice to mobilise the shoulder as pain allowed. She was sent to a physiotherapist as the pain settled. She made a rapid functional recovery and the fracture healed. She resumed all her normal activities.

Discussion. There are several previous reports of stress fracture of the scapula, due to repetitive subcritical loads (Boyer 1975; Veluvolu et al 1988) or a single muscle contraction (Rask and Steinberg 1978). Repetitive loads are

R. J. Hall, MB BS, Senior House Officer
P. T. Calvert, FRCS, Consultant Orthopaedic Surgeon
St George's Healthcare NHS Trust, Blackshaw Road, London SW17 0QT, UK.

Correspondence to Mr P. T. Calvert.

©1995 British Editorial Society of Bone and Joint Surgery
0301-620X/95/1R24 \$2.00

J Bone Joint Surg [Br] 1995;77-B:153-4.

Received 8 February 1994; Accepted 17 March 1994