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Latissimus dorsi transfer for recurrent dislocation of the shoulder

The results of latissimus dorsi transfer for recurrent anterior dislocation of the shoulder performed during the past three decades were subjected to a failure analysis. Twenty patients operated on in the light of this had no episodes of dislocation and obtained full function.

The mode of action of the latissimus dorsi transfer explains the apparent paradox of an operation that produces external rotation resulting in the prevention of anterior dislocation. The action of the transfer in pulling the humeral head posteriorly is the most important feature. If the transfer is not located correctly, this force will be less than that produced in external rotation and dislocation will recur.

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For the past three decades, posterior transfer of the latissimus dorsi has been used for the treatment of recurrent anterior dislocation of the shoulder when dynamic instability (Saha 1971) was considered to be the primary cause and the glenohumeral joint was normal (Table 1). The advantage of this method over many others described for the treatment of this condition is that it produces no limitation of movement. Between 1956 and 1966, 47 consecutive cases were treated using this method (Saha 1967). The results were good in the majority, but 3 patients did develop recurrent dislocation several years afterwards. This led to a thorough investigation of the factors influencing the stability of the shoulder joint (Saha 1967) and resulted in the development of several radiographic indices. Between 1966 and 1974, a further 44 transfers were carried out. All the patients had undergone the anthropometric investigations and all had values within the normal limits. However, two of these patients suffered a recurrence of dislocation, and one had a large Hill-Sach's lesion. This led us to reconsider our indications for surgery.

Rowe (1956) indicated that patients with mild or moderate Hill- Sach's lesions in the posterior section of the head would not develop recurrence of the dislocation provided that the width of the defect was narrow and its margins were smooth. However, if the lesion was located more anteriorly, was wide and deep, and the edge was sharp as if it had been chiselled, the dislocation was liable to recur. Therefore, between 1974 and 1985 the transfer was performed only on patients with normal anatomic indices and without moderate or severe Hill-Sach's lesions. The results of latissimus dorsi transfer in these patients are presented in this paper.

Patients and methods

Twenty men aged 25 (14-40) years who presented with recurrent anterior dislocation of the shoulder and who had normal anatomic indices (Saha 1971) with no significant Hill-Sach's lesion underwent latissimus dorsi transfer between 1975 and 1985 (Table 2). Follow-up was an average of 4 (1-10) years. Three patients were engaged in heavy work and the remainder had sedentary occupations.

The operation has been described in detail by Saha (1967). The latissimus dorsi is exposed by an incision in the axilla and widely mobilized, keeping the nerve supply and main blood vessels intact. Its tendon is

Table 1. Overall number of operations in the three phases of development of the operation.

Period	Number of cases	Number of operations	Full functional recovery with no recurrence and no apprehension	Functional recovery with continuing apprehension[a]	Redislocation
1956–66	47	48	43	2	3
1967–74	39	44	41	1	2
1975–85	20	20	20	–	–

[a] Two recovered fully by reassurance and muscle development.

severed from its insertion to the humerus, folded on itself, and taken beneath the deltoid in a tunnel superficial to the teres major and the long and medial heads of the triceps. It is brought out through a small incision just beneath the angle of the acromion, which exposes the posteroinferior part of the greater tuberosity. The folded tendon is then implanted near the junction of the tendinous and fleshy parts of the teres minor using strong prolene sutures. The wound is closed, and the limb is immobilized in a plaster spica with the arm in about 90° of abduction in the scapular plane and in slight external rotation. This immobilization is maintained for 6 weeks after which the patient undergoes rehabilitation.

Results

All 20 patients had full function without apprehension or recurrence of dislocation (Table 2). All returned to work, the majority to their former occupation, including the 3 patients engaged in heavy work.

Discussion

In earlier reports (Saha 1953, 1967, 1981) it was demonstrated that good results could be obtained by the use of latissimus dorsi transfer in the treatment of recurrent anterior dislocation of the shoulder (Table 1). In this series, we have shown that with proper attention to the pathologic anatomy perfect results can be obtained.

But how can transferring latissumus dorsi from its insertion into the conjoint tendon of the humerus, where it acts as an internal rotator, to the posteroinferior part of the greater tuberosity of the humerus, where it will act as an external rotator prevent anterior disloca-

Table 2. Details of patients operated between 1975 and 1985.

Case No.	Age	Occupation[c]	Side	First episode	Number of episodes	Hill-Sachi lesion[b]	Humeral retrotorsion in degrees	Glenoid retrotilt in degrees	Period to last follow-up (yr-mo)	Results at follow-up[d] Occupation[c]
1	38	Service	L	S	25	N	28	4	6–2	P
2	31	Service	R	T	10	M	31	6	9–10	P
3	40	Games teacher	R	S	30	N	31	5	5–2	P
4	21	Service	L	S	7	N	30	4	4–11	P
5	22	Student	R	T	7	M	32	3	4–4	Service
6	19	Student	L	T	6	N	30	4	7–4	Business
7	12	Student	L	S	11	N	31	5	5–4	P
8	24	Farmer	R	S	3	N	34	2	2–8	P
9	27	Service	R	T	12	N	22	2	4–4	P
10	23	Student	R	S	12	N	32	7	5–4	Service
11	28	Tailor	R	T	14	Mod	28	6	5–0	P
12	14	Student	R	S	6	N	30	4	3–6	P
13	26	Shop-keeper	R	T	8	N	26	8	2–10	P
14	28	Farmer	R	T	6	M	28	6	3–9	P
15	20	Student	L	S	15	N	33	7	3–5	P
16	23	Service	R	T	14	M	27	5	2–8	P
17	30	Business	L	T	10	N	32	4	2–9	P
18	21	Student	L	T	10	M	29	3	2–5	Apprentice
19	36	Business	R	T	15	M	31	5	1–8	P
20	25	Student	L	T	6	M	26	6	1–0	P
Mean	25				11		30	4.8	4–3	

[a] First episode: S = Spontaneous, T = Traumatic. [b] Hill-Sach's: N = None, M = Mild, Mod = Moderate, [c] occupation P = as before. [d] All patients had full funchion without apprehension or recurrence of dislocation.

tion, which is usually associated with activities involving external rotation of the upper limb? Consideration of the reconstructed anatomy at the shoulder joint after the transfer reveals that the latissimus dorsi lies posterior and inferior to the center of rotation of the shoulder joint, i.e., approximately the center of the humeral head. Therefore, in addition to producing external rotation, contraction of the latissimus dorsi, which occurs throughout abduction (Saha 1967), will attempt to produce posterior movement of the humeral head relative to the glenoid. The balance between the external rotation forces and the posteriorly acting forces will determine whether dislocation will occur. In an individual with normal musculature, it is the strength of the posterior pull that will determine the occurrence of dislocation. It is the site of insertion of the transfer that determines this factor.

The upper humeral articular surface can be considered as being part of a sphere almost all of which is contained within the upper end of the humerus (Figure 1). For a maximum posterior pull to be exerted, the transfer of the latissimus dorsi should be as close as possible to the posterior surface of the sphere. This will also reduce the force of external rotation exerted by the muscle. This site of insertion is represented by the lowest posterior limit of the greater tuberosity, often marked by a tubercle, at the junction of the tendinous and fleshy parts of the teres minor. If the transfer is inserted too far away from this point, then the external rotatory action will be greater than the posterior pulling action and dislocation is likely.

In order to obtain optimal results from the use of the latissimus dorsi transfer in the treatment or recurrent anterior dislocation of the shoulder, it is necessary to ensure that there are no abnormal anatomic parameters, including Hill-Sach's lesions, and that the insertion of the transfer into the humerus is correctly sited.

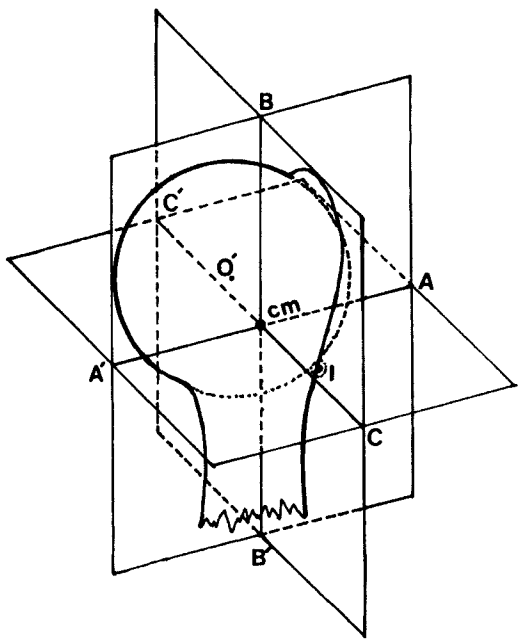

Fig. 1. Schematic diagram showing orthogonal axes through the centre of mass (cm) of the right proximal humerus and the site of transfer of latissimus dorsi (I). O' is the centre of mass of the sphere containing the articular surface as viewed from the back.

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