ORIGINAL ARTICLE

STIFF ELBOW TREATMENT BY INTERPOSING ARTHROPLASTY ASSOCIATED TO HINGED EXTERNAL FIXATOR

Alberto Naoki Miyazaki[1], Marcelo Fregoneze[2], Pedro Doneux Santos[3], Luciana Andrade da Silva[3], Nelson Gennaro Junior[4], Sergio Luiz Checchia[5]

ABSTRACT

Objective: Assess the results of the elbow/ *fascia lata* interposing arthroplasty technique associated to the use of a hinged external fixator in the treatment of stiff elbow. Methods: Between 2001 and 2006, five cases of stiff elbow were operated and followed up by the Shoulder and Elbow Group of the Santa Casa Misericórdia de São Paulo Medical Sciences School, establishing the following as inclusion criteria: patients with below-functional elbow range of motion associated to degeneration on that joint, for whom total prosthesis had not been indicated. Patients' ages ranged from 21 to 55 years (mean: 38). Male gender was prevalent (four cases), and, in all cases, the dominant side was operated. Concerning etiology, two cases of infectious arthritis sequels, one post-trauma sequel, and two rheumatoid arthritis were found. Preoperative range of motion ranged from 20° to 30° of flexion-extension; in two cases, fixed contracture existed in flexion at 30˚ and 65˚. The patients were assessed according to Bruce-modified AMA criteria. Results: The mean follow up time was 54 months. All patients showed improvement of the Bruce index, which, preoperatively, was 43.5, increasing to 88.2 postoperatively. We found two excellent cases, one good, one fair, and one poor. Conclusion: *Fascia lata* interposing arthroplasty associated to the use of a dynamic external fixator on stiff elbows is a feasible alternative for patients not indicated to total elbow arthroplasty.

Keywords – *Elbow joint; Arthoplasty; Range of motion, articular; External fixators*

INTRODUCTION

The sequelae of severe elbow fractures, rheumatoid and infectious arthritis, contribute in varying degrees to the stiffness of this joint[1-3]. According to Morrey *et al.*[4], most activities performed with the arms depend on a 100° range of motion of the elbow (Morrey's functional arc), ranging between 30° and 130°, and 100° of pronosupination. The loss of degrees of movement generates functional deficits, impeding the simple activities of daily living, such as taking the hand to the mouth and personal hygiene, among others, as well as progressive and incapacitating pain[5,6].

Resection and elbow interposition arthroplasty, the first arthroplasty techniques, were developed in the period between 1885 and 1947[7,8]. After 1947, replacement arthroplasty with partial or total prosthesis (restricted or hinged), fixed by polymethylmethacrylate cement[7], became and remain one of the main forms of treatment of all conditions, whether

1 – Professor, Attending Physician, Head of the Shoulder and Elbow Surgery Group, Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo
2 – Assistant Professor, Assistant, Shoulder and Elbow Surgery Group, Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo
3 – Assistant, Shoulder and Elbow Surgery Group, Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo
4 – Physician, Former Intern of the Shoulder and Elbow Surgery Group, Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo
5 – Associate Professor, Chief Clinician, Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo

Study conducted at the Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de São Paulo, "Fernandinho Simonsen Pavilion" – Director: Dr. Osmar Avanzi
Correspondence: Santa Casa de Misericórdia de São Paulo, Departamento de Ortopedia e Traumatologia, "Pavilhão Fernandinho Simonsen", – Rua Dr. Cesário Mota Júnior, 112 – Vila Buarque. CEP 01220-020. São Paulo – SP. Fone/Fax (0xx11) 3222-6866 – Email: amiyazaki@uol.com.br

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traumatic or not, that lead to widespread destruction of the articular surface of the elbow[7,8]. Although partial or total arthroplasty of the elbow is well-known and widely used, it should not be the treatment choice in young and/or active patients[2,9-10], in which the use of the upper limb is constant and requires strength, as it causes a high index of release of components[2,9-10]. For these cases, arthrodesis is an alternative, but patients do not always accept it well due to the resulting major limitation of motion[8,10].

In recent years, interposition arthroplasty of the elbow has been rescued as a treatment of joint stiffness when the indication of other surgeries, such as by replacement arthroplasty or arthrodesis, cannot me*et al*l of the patient's needs[6-10].

Interpositions with biological tissues such as *fascia lata* and adipose tissue to coat bone ends was introduced by Murphy in 1902, cited in Wright and Sisk[7]. In 1918, Baier, cited in Wright and Stewart[8], used silicone, rubber, and chromium-based membrane as tissue for interposition, obtaining satisfactory results. However, the *fascia lata* remains the most commonly used tissue in interposition arthroplasty due to the ease of its removal and because it causes less damage to the donor site[1,3,7-8].

The determination of the center of rotation of the humeral head by Steindler[9,11] was instrumental in the current treatment of elbow stiffness. The center of rotation is the exact point in the three-dimensional plane at which elbow flexoextension occurs with no changes to the central axis of the arm relative to the forearm[9,11-13].

With information regarding the center of rotation, Volkov and Oganesian[6] were the first authors that linked the use of external fixation in conjunction with the interposition of *fascia lata*, using this technique successfully in 28 cases of elbow stiffness.

This paper aims to present the results of interposition arthroplasty of the elbow with *fascia lata* associated with the use of hinged external fixator in the treatment of stiff elbow.

MATERIALS AND METHODS

Between October 2001 and July 2006, five patients with stiff elbow were operated and monitored by the Shoulder and Elbow Group of the Department of Orthopedics and Traumatology, School of Medical Sciences, Santa Casa de Misericórdia de São Paulo, Fernandinho Simonsen Pavilion, where we used interposition arthroplasty with *fascia lata* associated with the use of a hinged external fixator of the elbow.

The inclusion criteria were patients whose range of motion in the affected elbow was less than the functional[4], along with destruction of the articular surface demonstrated by imaging studies, coupled with contraindications for total elbow prosthesis. We excluded all patients who did not fit the criteria set forth above.

The patients' ages ranged from 21 to 55 years, with an average of 38 years. There was a prevalence of males (four cases), and in all cases, the dominant limb was the one operated (Table 1).

The mean duration of symptoms after initiation of the causative agent was six years (Table 1).

The etiology of the lesions is described in Table 1.

In four patients, surgery had been attempted previously to gain joint mobility, without success. In case 3, the radial head was resected, and in case 4, a humeroulnar arthroplasty, that is, a hole in olecranal fossa of the distal humerus[5] (Table 1).

The transposition of the ulnar nerve was performed in three cases (Table 1).

The dynamic external fixator remained for 60 days, on average, and was removed after this period (Table 1).

Tabela 1 – Patient data

	Patient	Gender	Age (years)	Dom.	Etiology	Evolution Δt (months)	Follow-up Δt (months)	Previous surgeries	Ant. Ulnar n.	Δt external fixation (months)	Observations
1	A.R.L.	Male	47	+	Post-traum.	5	87	-	+	57	
2	A.P.	Male	34	+	Infec. Art.	1	72	1	+	73	Ligament reconstruction
3	C.M.F.	Male	55	+	Rheum Art.	4	60	1	-	54	
4	J.M.S.	Male	43	+	Tub. Art.	17	30	2	+	60	
5	J.S.A.	Fem.	21	+	JRA	5	24	3	-	55	

Source: Archives (SAME), Department of Orthopedics and Traumatology, Santa Casa de São Paulo

Legend: Fem.: female; Dom: dominance; Evolution Δt: time interval between diagnosis and interposition surgery; Δt: time interval; Traum.: Traumatic; Infec.: infectious, Art.: arthritis; Rheum.: rheumatoid; Tub: tuberculous; JRA: juvenile rheumatoid arthritis.