RESULTS

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All patients were followed-up for an average period of 28.74 months. This period ranged from 25 to 39 months, with a mode of 25 months, and standard deviation of ± 5.68. After painstakingly clinical and stress-radiographic assessment, patients were grouped into excellent, good, fair, and poor groups according to the subjective and objective "100-point" scales (fig 33 a & b). Parametric statistical evaluation of the results was performed using the "Microsoft Excel-5" computer program to determine the significance and rate of improvement, and to detect the factors that influenced the results.

CLINICAL ASSESSMENT:

(A) SUBJECTIVE RESULTS: Preoperatively, all patients were complaining of giving way and pain, while 43 of them complained of joint swelling, and 9 of locking. At the end of follow-up, only 6 patients complained of true subluxations or jumping out of the joint. This did occur in association with cutting in 4 of them, and with all activities including the daily living ones in only 2 cases. Nevertheless, 21 patients had persistent feeling of joint's insecurity. Although they did not have true jumping out of the joint anymore, they developed positive apprehension about it. This feeling was always associated with sports participation. Although 27 patients were still compiling of pain, 25 of them had very mild pain that may be precipitated by prolonged participation in strenuous sports. The remaining 2 cases however were complaining of remarkable pain that was associated with all types and levels of sports. Nevertheless, these 2 patients have gotten some benefit as they were preoperatively complaining of severe pain in association with all daily living activities. Unfortunately 15 patients developed a new type of pain which was strictly localized to the site of the fixation devices. This pain was mainly produced by either loaded or unloaded flexion and extension of the joint. It was always associated with a well defined tender firm swelling at the same site. This pain however disappeared completely following removal of the fixation devices. Swelling of the joint did persist in 2 out of 43 cases. These 2 cases showed some improvement, in terms of the level of activity at which swelling occurred. Instead of being correlated to all types and levels of sports, swelling would follow strenuous sports only. Non of the patients had anymore locking.

THE LEVEL OF SUBJECTIVE INSTABILITY			POSTOPERATIVE	
	Number	Percentage	Number	Percentage
No feeling of instability	0	0%	23	46%
Feeling of instability with all sports	4	8%	21	42%
Subluxation with cutting	21	42%	4	8%
Subluxation with all sports	23	46%	0	0%
Subluxation with all activities	2	4%	2	4%
TOTAL NUMBER OF PATIENTS	50	100%	50	100%

Table (6 - a): PRE & POSTOPERATIVE SUBJECTIVE INSTABILITY.

THE ACTIVITY LEVEL THAT INDUCES PAIN			POSTOPERATIVE	
	Number	Percentage	Number	Percentage
No pain did occur whatever the level of activity	0	0%	23	46%
With strenuous sports	12	24%	25	50%
With most sports	17	34%	0	0%
With all sports	19	38%	2	4%
With daily activities	2	4%	0	0%
TOTAL NUMBER OF PATIENTS	50	100%	50	100%

Table (6- b): INCIDENCE OF PRE & POSTOPERATIVE PAIN.

THE ACTIVITY LEVEL THAT PREDISPOSES TO EFFUSION	PREOPERATIVE		POSTOPERATIVE	
	Number of patients	Percentage	Number of patients	Percentage
No effusion is produced at any level of activity	7	14%	48	96%
Following strenuous sports	34	68%	2	4%
Following most sports	9	18%	0	0%
TOTAL NUMBER OF PATIENTS	50	100%	50	100%

Tble (6-c) : PRE & POSTOPERATIVE SUBJECTIVE SWELLING.

(B) OBJECTIVE RESULTS:

In spite of improvement of muscular functions, atrophy of thigh muscles persisted in 27 cases (fig. 7-a). Only 2 of them had marked atrophy, while 25 patients had moderate wasting of an average difference in circumferences of 1.5 cm.

DEGREE OF WASTING	MARKED (> 3 cm.)	MODERATE (1.1 - 3 cm.)	MILD (< 1 cm.)	TOTAL NUMBER OF PATIENTS
PREOPERATIVE NUMBER OF PATIENTS	2 (4%)	23 (46%)	4 (8%)	50 (100%)
POSTOPERATIVE NUMBER OF PATIENTS	2 (4%)	25 (50%)	0	27 (54%)

Table (7- a) : PRE & POSTOPERATIVE INCIDENCE OF MUSCLE WASTING.

Although all patients had had full range of motion, 28 cases developed some restrictions. However, serious limitation of movements did occur in only 2 of them, who had perminant limitation of flexion up to 90 degrees. Otherwize, 3 patients developed limitations of the last 30 degrees of flexion, while 23 patients had limitations of the final 15

degrees. Only one patient developed limitation of the terminal 5 degrees of extension in addition to the limited 15 degrees of flexion.

THE DEGREE OF RESTRICTED MOBILITY	Limitation of flexion up to 130 degrees	Limitation of flexion up to 115 degrees	Limitation of flexion up to 90 degrees	Limitation of the final 15 degrees of flexion & of the terminal 5 degrees of extension	TOTAL NUMBER	PERCENTAGE
No. OF PATIENTS	23	2	2	1	28/50	56 %

Table (7-b) : INCIDENCE OF POSTOPERATIVE STIFFNESS.

Except for 2 cases, stability of all joints were improved. The anterior drawer test demonstrated 11 negative results, 37 mild, and 2 severe laxity grades. The Lachman test was negative in 11 cases. It revealed 33 mild, 4 moderate, and 2 severe grades. The jerk test became negative in 46 patients.

RESULTS OF THE ANTERIOR DRAWER TEST	PREOPERATIVE NUMBER OF PATIENTS	POSTOPERATIVE NUMBER OF PATIENTS
Negative	0	11 (22%)
Grade I laxity	4 (8%)	37 (74%)
Grade II laxity	25 (50%)	0
Grade III laxity	21 (42%)	2 (4%)
TOTAL NUMBER OF PATIENTS	50	50

Table (7-c): PRE & POSTOPERATIVE INSTABILITY AS DETECTED BY THE ANTERIOR DRAWER TEST.

RESULTS OF THE LACHMAN TEST	PREOPERATIVE NUMBER OF PATIENTS	POSTOPERATIVE NUMBER OF PATIENTS
Negative	0	11 (22%)
Grade I laxity	23	33 (66%)
Grade II laxity	23 (46%)	4 (8%)
Grade III laxity	27 (54%)	2 (4%)
TOTAL NUMBER OF PATIENTS	50	50

TABLE (7-d) : PRE & POSTOPERATIVE RESULTS OF THE LACHMAN TEST.

GRADING OF RESULTS:

The previously described 100-point scale was used for numerical assessment of both subjective and objective results. We preferred this scale as it allows particular judgment of the state of the ACL. Furthermore, it avoids the possible misleading effect of additive scales. Nevertheless, we did not apply the 100-point scale for functional evaluation. In this regard we considered the scale useless because it depends upon poorly verified subjective questionnaire.

Preoperatively, 23 patients (46%) were subjectively judged as fair, and 27 (54%) as poor. Objective evaluation of these patients showed 4 fair (8%), and 46 (92%) poor cases. Discrepancy between subjective and objective judgments did occur in 19 cases (38%); who had fair subjective scores in spite of poor objective ones. Following-up all patients (50 cases) for an average postoperative period of 28.74 months revealed: 23 excellent (46%), 21 good (42%), 4 fair (8%), and 2 poor (4%) subjective results. Objective results of these patients involved 11 excellent (22%), 31 good (62%), 2 fair (4%), and 6 poor (12%) results.

PREOPERATIVE ASSESSMENT USING A 100 POINT SCALE

	NUMBER OF PATIENTS IN EACH GRADE			
	EXCELLENT	GOOD	FAIR	POOR
SUBJECTIVE	0	0	23	27
	0	0	4	46

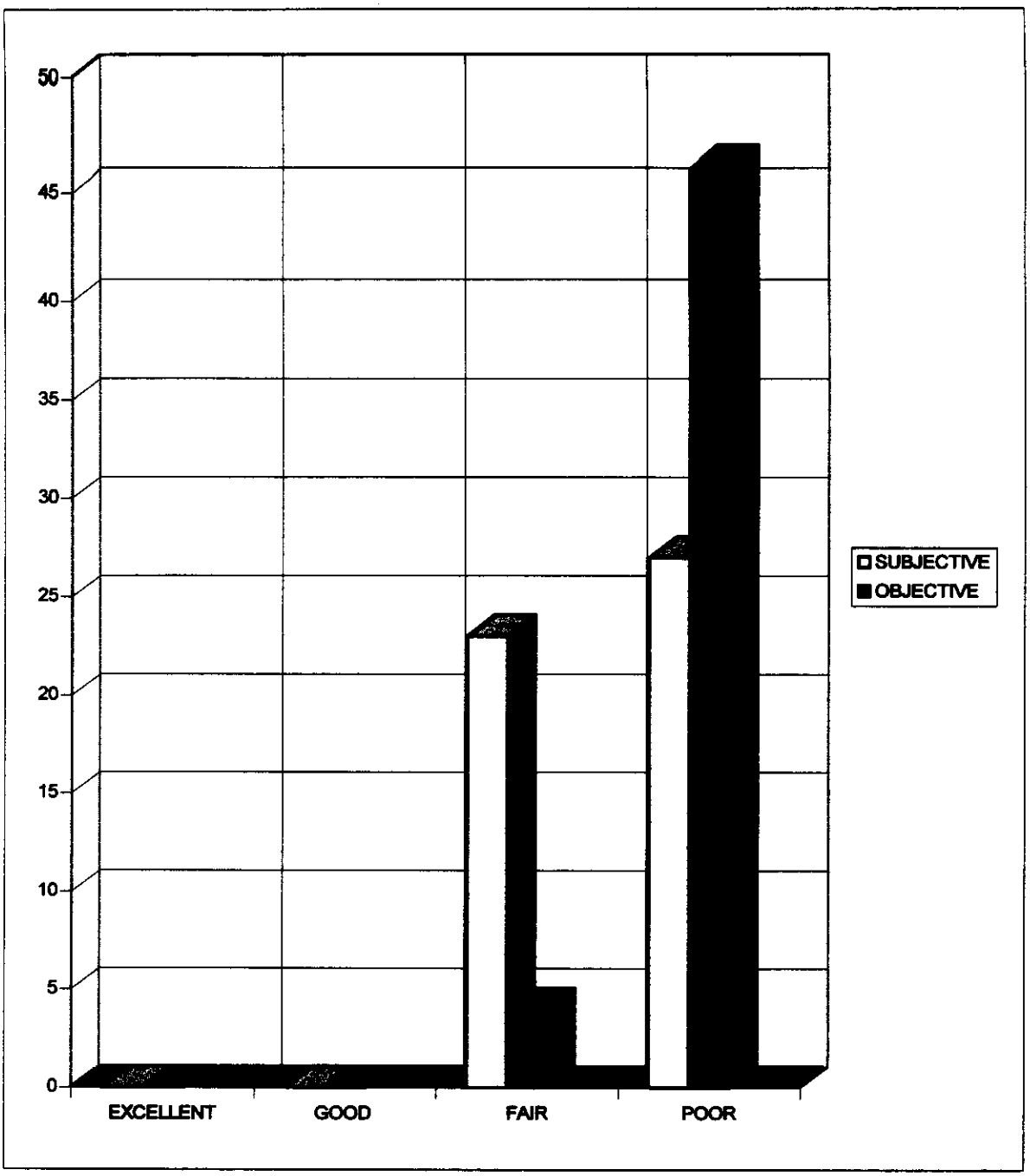

Fig. (54)

POSTOPERATIVE ASSESSMENT USING A 100 POINT SCALE

	NUMBER OF PATIENTS IN EACH GRADE			
	EXCELLENT	GOOD	FAIR	POOR
SUBJECTIVE	23	21	4	2
	11	31	2	6

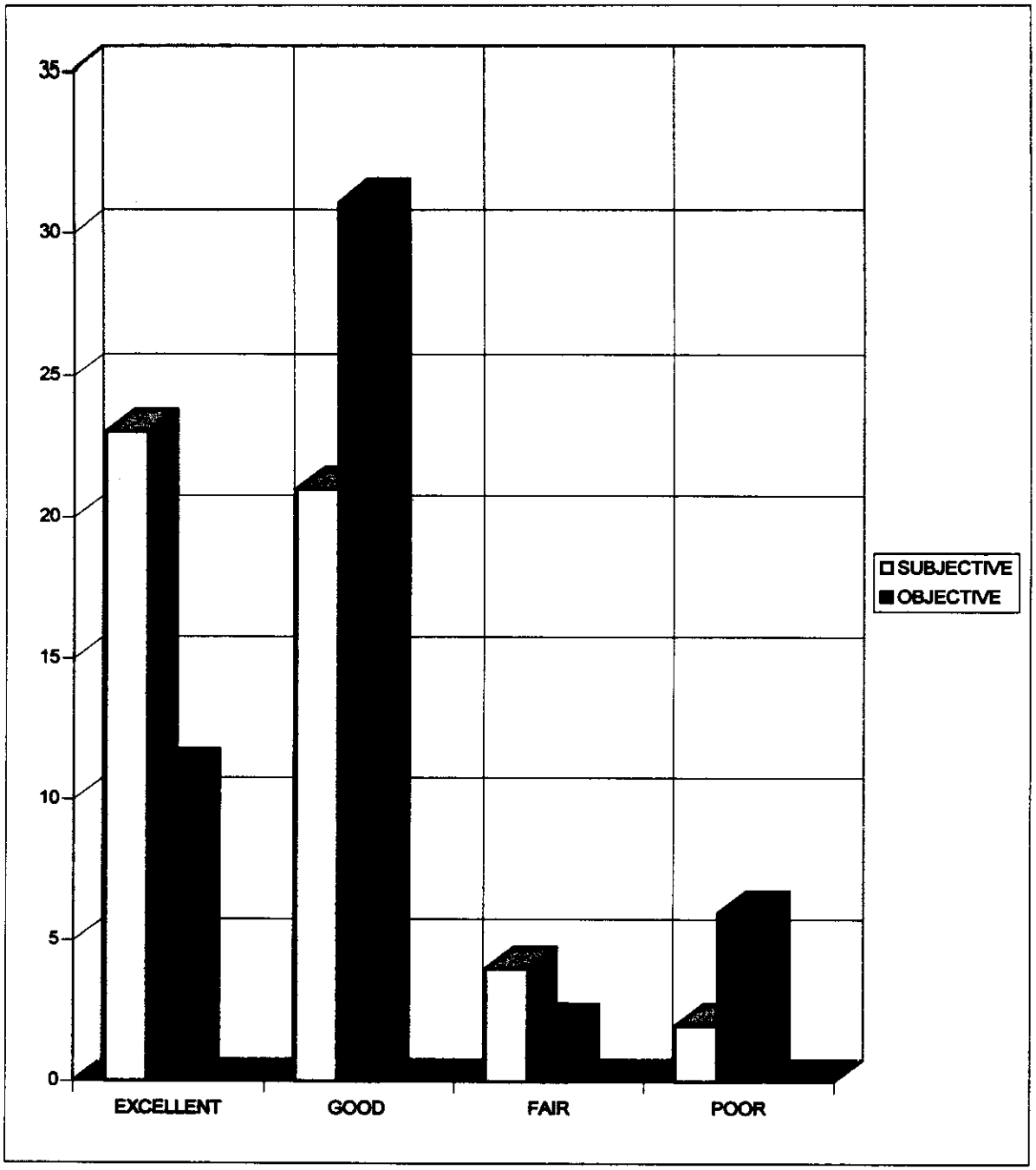

Fig. (55)

Subjectively, the majority of patients (88%) improved by 2 grades. Four patients (8%) improved by one grade; while the remaining 2 patients (4%) did subjectively improve within the same grade. Objective improvement by 2 grades represented also the most common pattern (70% of cases). Seven cases (14%) showed objective advancement by 3 grades, 4 (8%) improved within the same grade, and 2 (4%) by one grade only. The remaining 2 cases (4%) did not show any objective improvement.

SUBJECTIVE IMPROVEMENT	Within the same grade	By one grade	By 2 grades	By 3 grades
No. OF PATIENTS	2 (4%)	4 (8%)	44 (88%)	0

Table (8-a): RATE OF SUBJECTIVE IMPROVEMENT

OBJECTIVE IMPROVEMENT	No	Within the same grade	By one grade	By two grades	By three grades
No. OF PATIENTS	2 (4%)	4 (8%)	2 (4%)	35 (70%)	7 (14%)

Table (8- b): RATE OF OBJECTIVE IMPROVEMENT

STATISTICAL ANALYSIS:

The results were statistically analyzed on a parametric basis using the "Microsoft Excel-5" computer program. The average preoperative subjective score was 57.87 points, with a mode of 70 points, and standard deviation of ± 14.006252. Postoperatively, the average subjective score became 89.3 points, with a mode of 100 points, and standard deviation of ± 13.32521. Preoperative objective scores however showed an average of 60.68 points, with a mode of 65 points, and standard deviation of ± 5.90551. These objective scores were improved postoperatively to reach an average valueof 86.78 points, with a mode of 89 points, and standard deviation of ± 11.1909. The mode revealed common discrepancy between both pre and postoperative subjective and objective scores. This discrepancy was created due to the commonly observed higher subjective scores.

STATISTICAL VALUES		Postoperative subjective scores		Postoperative objective scores
Average		89.3		86.78
Mode		100		89
Standard deviation		±13.32521		±11.1909
Median		85		89

Table (9 - a) STATISTICAL REPRESENTATION OF PATIENTS

The t-Test revealed t Critical one-tail of 1.676551165 for both subjective and objective results. This value is significant at the level of 0.01. Thus, a statistically significant improvement (95%) has been reported. The most common pattern of improvement as detected by the mode was advancement by 2 grades. Other calculated values are reported in table 9-b.

ITEM	Mean	Variance	Pearson correlation	D F	t-Stat	P(T<=t) one tail	t critical one tail (at 0.01)
Postoperative subjective	89.3	177.56	0.859174237	49	30.6062	6.71194E-34	2.42
Postoperative objective	86.78	125.23632	0.42814696	49	18.13896	1.10437E-23	2.42

Table (9 - b): STATISTICAL SIGNIFICANCE OF IMPROVEMENTS.

Pre and postoperative subjective scores are strongly correlated, while per and postoperative objective ones are not. No correlation has been found between the age, the duration of injury, or any other factor and postoperative subjective nor objective scores. A negative correlation has been found between meniscectomy and both subjective and objective scores. Therefor, it has been clearly demonstrated that menisectomy is the most evident single factor that adversely affected the results.

CLINICAL ANALYSIS:

Preoperatively, all patients (50) did complain of knee pain and instability that was associated with different levels of activities and sports. At the end of an average follow-up period of 28.74 months, twenty-three out of these 50 patients (46%) have achieved painless stable knees. Although the remaining 27 patients have some residual pain and subjective instability, these symptoms have occurred in association with higher levels of activity and sports. These residual symptoms did not interfere with the occupationally mandated performance ability of 21 of these 27 patients (42% of the total number of patients).

Forty-four patients (88%) have satisfactorily performed the functional tests. They have gotten (0 to 1+) anterior tibial laxity as detected by the Lachman test, and negative pivot shift. However, only 26 of these 44 patients (52% of the total number of patients) have restored their pre-injury level of sportive fitness. Sportive limitations of the remaining 18 patients (36% of the total number of patients) have been found to be associated with limitation of the flexion arc beyond 120 degrees, and persistent moderate thigh wasting. Eleven out of these 18 patients had total meniscectomies (6 medial & 5 lateral).

Persistent symptomatic instabilities have adversely affected the occupationally mandated performance ability of 6 patients (12%). All these 6 patients had total meniscectomies (4 medial & 2 lateral). Unfortunately 2 of them have gotten significant limitation of flexion.

COMPLICATIONS

1- WOUND COMPLICATIONS:

In our series 7 patients (14%) had necrosis of the skin edges in spite of meticulous handling of the skin flaps that were left carefully with all subcutaneous tissue. Nevertheless, successful treatment of all cases was achieved following a short period of regular dressing and joint immobilization. Although these patients achieved satisfactory net results (2 excellent, and 5 good results), they had ugly scars.

In spite of the routinely used extensive exposure, the rate of wound infection was very low. We had no deep intraarticular infections. Only two patients had superficial wound infection. One of them was responsible for his infected wound as he inserted a metal crucifix into the wound through the window that was cut in the plaster to allow electrical stimulation of the muscles. This patient had also an injury to the saphenous nerve. Both infected cases were completely cured in response to systemic antibiotics, wound irrigation, and joint immobilization.

2- COMPLICATIONS OF THE FIXATION DEVICES:

This pattern of complication was by far the commonest. It involved painful granulomatous reactions that occurred in relation to the fixation device among 15 patients (30%). These granulomatous reactions could be explained as n irritation synovitis in response to the silk sutures and loose staples. It was infected in one patient; with consequent production of posterior chronic discharging sinus. Removal of the fixation devices (9 staples and 6 screws), and of remaining silk sutures solved such problems.

3- PERMANENT STIFFNESS:

Although 29 of the 50 patients (58%) developed some degrees of permanent stiffness, only 2 of them had significant limitations. These 2 patients had limited flexion arcs up to 90 degrees.

Fig (56): In spite of the demonstrated ugly scar that followed slough of the skin edges and of the slightly limited flexion, this patient achieved an excellent result with no occupational nor sports limitations.

SECONDARY PROCEDURES:

Only 4 (8%) patients were not satisfied with their results. Two of them were markedly disabled due to limitation of flexion up to 90 degrees, while the remaining 2 patients felt no improvement. The last 2 patients were readmitted for another reconstruction. Intraarticular reconstruction using the central one third of the patellar tendon was the procedure of choice. During operation, old grafts were found to be extensively relaxed in spite of being viable. Removal of such relaxed graft was mandatory to avoid crowding within the joint. The initial results of these 2 cases have been found to be satisfactory.