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Our Study on Surgical Management of Camptodactyly

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1. INTRODUCTION

Pamprodactyly is an uncommon hand anomaly involving varying degrees of congenital or acquired flexion contracture of the fingers at the proximal interphalangeal (PIP) joint, which can be unilateral or bilateral.1,2 This condition affects about 1-2% of the general population and most commonly involves the little finger.3 Many etiologies have been attributed which include abnormal lumbricals, short flexor digitorum superficialis (FDS), skin shortening, tight fascial bands, deficient extensor central slip and changes in the distal interphalangeal joint or metacarpophalangeal joint

Camptodactyly = Bent finger [from the greek κάμπτω (to bend) and δάκτυλος (finger)] • 1st description by Tamplin, 1846 • 1st use of the name by Landouzy-1906 • Nontraumatic finger PIP joint f lexion deformity, often occurring bilaterally (≈ 2/3). • Mostly the little finger (94% of cases - Engber)

Causes: abnormal volar structures • Abnormal lumbrical insertion (96% of his cases), 47% FDS anomaly -Mc Farlane • Volar skin tightness and very few lumbrical insertion anomaly (10%) - Siegert• Hypoplastic FDS tendon

Cause- abnormal dorsal structures • Anomalies of the extensor mechanism • Absence of lateral bands- Smith • Absence of extensor mechanism - Carneiro • Extensor mechanism anomalies- Koman

The deformity generally increases during growth spurts, especially during the periods of rapid growth from one to four years and from 10 to 14 years of age.5,11,13 The primary cause of this deformity is still a matter for discussion and there is no consensus in the worldwide literature. 3,4,8,10–13 Although some cases occur sporadically, there is often anautosomalinheritancepatternpresent. 4,7,8,14 The metacarpophalangeal and distal interphalangeal joints are unaffected, although they may develop compensatory deformities.

Types of Camptodactyly (Type 1): This is the most common form. It is present from birth and there are no other related problems. It affects males and females equally. (Type 2): This is like type 1 but presents in teenagers. Girls are more commonly affected than boys. (Type 3): This is a more severe form, involving multiple fingers and presenting at birth. It is usually associated with a medical syndrome.

Proven to show an autosomal dominant pattern of inheritance [9]. This condition of ten does not cause functional impairment, meaning that patients seek medical attention for concerns relating to cosmetic appearance. Treatment for Camptodactyly may be conservative (non-surgical) or non- conservative (surgical), and the choice depends on the severity of the contracture.

Surgical treatment for camptodactyly has been recommended by a number of authors, although long-term objective data to support this are often lacking. In surgical approach, it is important to capture and repair any pathologic changes, not just to repair the contracture as such [6]. Postoperative care and rehabilitation, as well as patient co operation, are crucial for a favorable outcome of surgery[10].

In this study we present the outcomes of the surgical management of 16 hands with camptodactyly based on age of presentation. The aim of the study is to show that outcome of the surgical management depends on the age of presentation. and degree of contracture

2. MATERIAL AND METHODS

This retrospective study was carried out on fourteen patients (16 hands) . eight were males , and six females These patients with flexion deformity were admitted in private and public Hospitals and were managed by surgical treatment by single surgeon (dr wisam abuzaid) .

Inclusion criteria	Exclusion criteria
Deformity greater than 30	Recurrent cases
Symptomatic	Post traumatic
Progressive contracture	Deformity less than 30
One or two hands are affected	

The right side was affected in six patients, left in six and both in 2 patients. The time at which the patient or a member of the family noticed a flexion deformity of the fingers was taken as the time of onset, and ranged from birth to 10 y ears with an average of 4 years. The age at first referral ranged from three months to 14 years with an average of seven years. A rapid increase in the flexion deformity of the PIP joint was observed in 6 patients (37.4%) and the age at which this occurred ranged from eight to 14 years, with an average of 11. There were no associated anomalies of the hand or elsewhere. There was a positive family history in two cases (12%). The severity of contracture was 0” to 30” in 15 fingers which excluded from the study , 3 1” to 60” in 12, and 61” to 90” in 4 fingers.

X-rays showed a deformity of the head of the proximal phalanx and/or the base of the middle phalanx in 10 fingers (62.0%). Initially a splint was used to correct the deformity, together with passive stretching by the patient or a family member.

Operative Technique : Position: Surgery was carried out while the patient was lying supine. Anesthesia: All surgeries were carried out under general anesthesia. Tourniquet was applied in all cases. Approach: The PIP joint was approached by using a palmar ziqzaq inscision depending on the magnitude of the contracture and the status of the skin. A palmar longitudinal approach with Z-plasty lengthening is used for a mild to moderate flexion contracture. A full-thickness skin graft is selected for a severe PIP joint contracture. The incision is extended into the palm in a zigzag fashion for complete exploration of the digit. The proximal extent of the dissection ends at the transverse carpal ligament. Skin shortage within the palm is not an issue, and Z-plasty lengthening is not required.

Deeper Dissection: After the skin incision, any abnormal fascia and linear fibrous bands are released during exposure of the deeper structures. Additional release of the flexor tendon sheath, the flexor digitorum superficialis tendon, the checkrein ligaments, the collateral ligaments, and the volar plate may be necessary to obtain sufficient extension. The digit is explored for anomalous structures, with specific examination of the intrinsic muscles and flexor digitorum superficialis. Any anomalous origin or insertion of the lumbrical or interosseous muscles is resected . Traction is applied to the tendon in a proximal and distal direction to assess its excursion and insertion. In some cases we release A1 pulley and partial release at A3 pulley to release the flexor tendons After release and reconstruction the skin is closed and Kirschner wire fixation, and the interphalangeal joints straight. Postoperative Care: Immediate post-operative care: All patients were tested for capillary circulation before leaving the operating room after recovery. All patients were fitted in splint after the surgery. Movement restriction for all patient had camptodactyly surgery for five weeks. Intra venous antibiotics were given for 5 days then 2nd day of surgery plain X-ray is done. Patients were discharged from hospital after 2 days. The first visit of the patient to the outpatient clinic was 7-10 days after discharge, five weeks after surgery, the Kirschner wire, cast and the sutures are removed.. During 5 wks , the patient may engage in some light resistive strengthening. During 7 and 8 weeks, more resistance may be added to the strengthening program

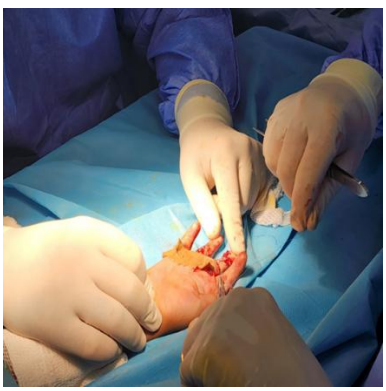

Figure 1: campto surgery

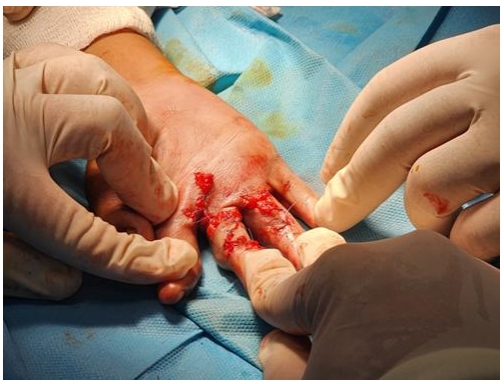

Figure 2: z plasty

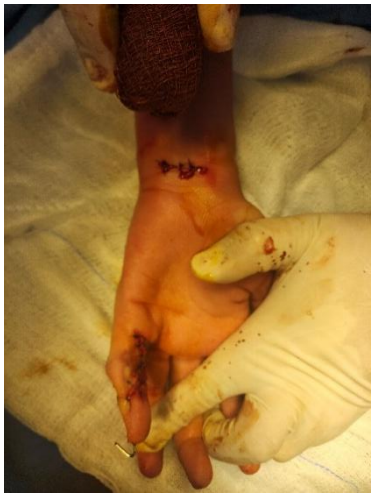

Figure 3: skin graft

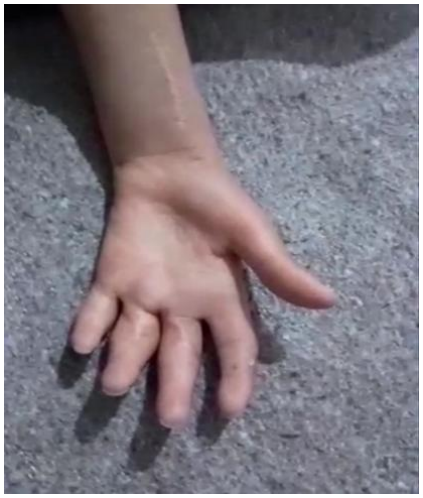

Figure 4: post surgery

Night splinting for first six to eight wks post k wire removal and daily physiotherapy is continuous for 3 months post k .wire removal .

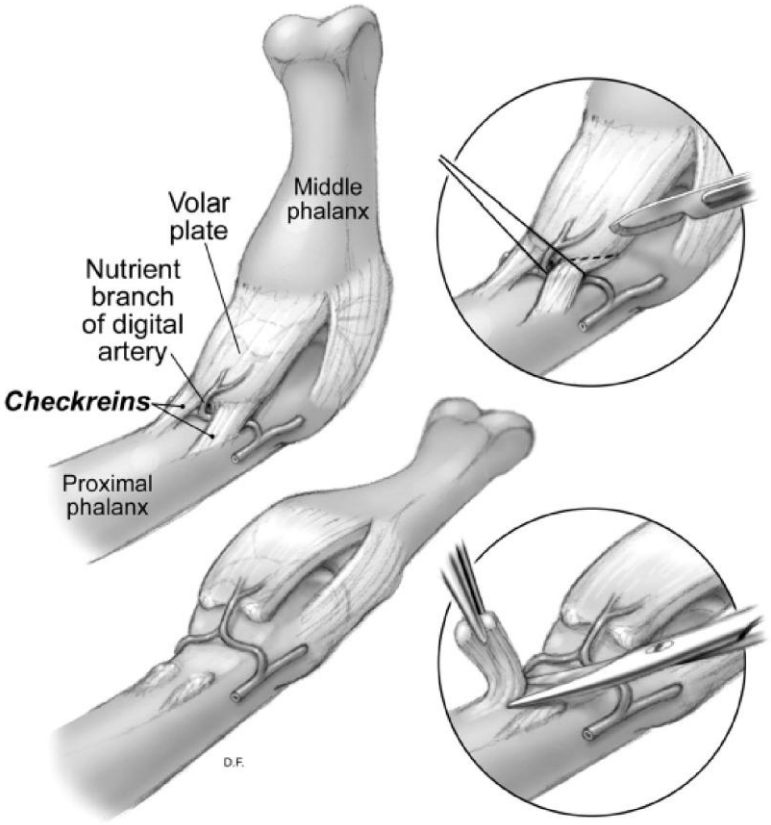

Fig. 1. Illustration of the checkrein ligament release technique for the

Figure 5 checkrein ligament

3. RESULTS

Results A total of 16 hands were operated on, Ten of the patients are the age of six or below, and six are above the age of six

The grading system (Mayo Clinic) proposed by Siegert

We use Sierget method for scoring post operative in which

Table 1: Sierget method for scoring

Excellent:	**Full Correction of extension, with less than 15° loss of flexion of the interphalangeal joint**
Good :	Correction with loss of up to 20° of extension and gain of extension of the interphalangeal join >40° with loss of flexion <30°
Fair:	Correction with loss of extension of up to 40° and gain of extension of the interphalangeal joint >20°, with loss of flexion <45°
Poor:	Correction with gain of extension of the interphalangeal joint

All patients with a preoperative mean extension lag of greater than 40° (range, 25°-90°) were operated on all fingers. The average period of follow-up was 10 months (range: 6–8 months). Four patients aged less than or equal to six years had a good outcome for all fingers, with a postoperative mean extension lag of 10° (range, 5° -15°). With the exception of two of the patients above the age of 10 had a poor outcome, with a postoperative mean extension lag of 30° (range 20°-40°).

Complication and worse surgery outcome is more with high degree of surgical contracture (older people)

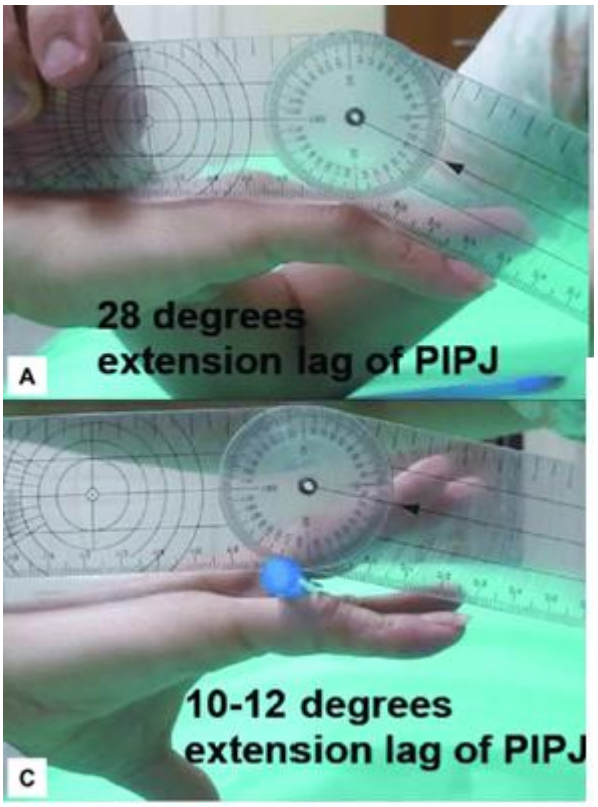

Figure 2 extension lag measurement

Table 2 Cases operative note

Hand no	Age	Treated digit	Fixed flexion (on an average)	Procedure	Post operative extension lag	Sierget method for scoring
1	4	all	45	Fds release, z plasty and k Wire fixation	15	EXCELLENT
2	4	all	50	Fds release, z plasty and k Wire fixation	15	EXCELLENT
3	5	Medial two	35	Fds release, z plasty and k Wire fixation	15	EXCELLENT

4	5	all	40	Fds release, z plasty and k Wire fixation	20	good
5	10	Little	65	Fds release, z plasty and k Wire fixation and a1 pulley release	40	Fair to poor
6	12	Little	60	Fds release, z plasty and k Wire fixation and a1 pulley release	40	Fair to poor
7	13	all	50	Fds release, z plasty and k Wire fixation	25	Good
8	6	Medial four	60	Fds release, z plasty and k Wire fixation and a1 pulley release	25	Good
9	9	all	50	Fds release, z plasty and k Wire fixation	15	EXCELLENT
10	8	Medial four	45	Fds release, z plasty and k Wire fixation	10	EXCELLENT
11	7	all	65	Fds release, z plasty and k Wire fixation and a1 pulley release	35	fair
12	6	Little	55	Fds release, z plasty and k Wire fixation	20	Good
13	4	all	35	Fds release, z plasty and k Wire fixation	10	EXCELLENT
14	3	Medial two	40	Fds release, z plasty and k Wire fixation	10	EXCELLENT
15	3	Medial three	70	Fds release, z plasty and k Wire fixation and a1 pulley release	35	fair
16	5	Medial Three	50	Fds release, z plasty and k Wire fixation	30	Fair

Table 3: Age of patients versus post operative Sierget method for scoring

Age group	Number of hands	Excellent	good	Fair	Poor
Six yrs and below	10	5	3	2	0
Above six yrs	6	2	1	1	2

Figure3 Post operative result 6 yrs and below

Figure4 Post operative result 6 yrs and above

Table 3 Total results

Number of hands	Excellent	good	Fair	Poor	Percentage of eceellent and good result	Percentage of fair and poor result
16	7	4	3	2	69 %	31%

such as lesions of neurovascular structures, scar tension during extension and loss of flexion

Table 5: Complication

Complication	Age of 6 and below	Above age of 6
Vascular complication	no	no
Neurological complication	1	0
Scar tension	2	1
Infection	no	1
Defect in flexion	1	2

Table 6: Compare of our study to Srikanth study

Compare to anather study	Our study	S Srikanth Professor, Department of Orthopaedics, Mamata Medical College, Khammam, Telangana, India
Name of hospital	Misurata medical centre + private hospital in misurata	Mamata Medical College, india
Total number of cases	16	10
PTs Six yrs and below	10	8
Excellent and good results	8	6
Poor results	2	2
Pts above six yrs	6	2
Excellent and good results	3	0
Poor results	3	2

4. DISCUSSION

The degree of flexion of the proximal interphalangeal joint in camptodactyly cases is correctly assessed if the wrist and metacarpophalangeal joints are placed in neutral position.

Deformities 60◦ interfere with function. The radiographic assessment is done in the AP and lateral views of the finger, in order to examine the configuration of the proximal interphalangeal joint set. The alterations that can be observed and which are generally associated with severe contractures are widening of the base of the middle phalanx with a notch on its joint surface and a chiseled cut on the head of the proximal phalanx with flattening of its surface.8,18,19

Smith and Kaplan [15] believe that contracture of the flexor digitorum superficialis initiates the flexion deformity in most cases of camptodactyly. In 12 fingers they report that the procedure tenotomy of flexor digitorum superficialis decreased the flexion contracture by at least 33%, with no loss of excursion or flexor strength our procedure is in accordance with Smith and Kaplan.

The clinical characteristics that should be observed and which guide the treatment are joint reducibility (flexibility) and the degree of deformity. The flexed posture of the proximal interphalangeal joint may be reducible, i.e. passively or actively flexible, or irreducible, i.e. fixed, when extension of the joint affected is not achieved.16In most cases, the flexion movement is not affected. This congenital deformity of relatively simple appearance has several types of presentation and is extremely difficult to treat.8,13The family should be advised that the treatment is long and that follow-up throughout the skeletal growth period is necessary; moreover, after partial or total correction, relapses may occur.5

Col R Ravishanker who reported Early detection and insertion of the K-wires corrected the subluxation and the deformity [14]. Following active and passive physiotherapy good function returned in the finger. In present study about distribution of grade there were 12.5% of cases in excellent grade, 12.5% of cases in good grade, 21.87% in grade fair and 53.12% in poor grade. Compared with Saulo Fontes who reported some difference of result [15]

Many studies have demonstrated success through conservative treatment consisting of use of braces and stretching exercises [2]. For younger children, the brace should include the hand and the wrist. This brace is initially used during the maximum period of acceptance, with intervals for stretching exercises guided by therapists, until the deformity has been corrected [17]. The importance of the parents with regard to correctly performing the exercises should not be underestimated, because aggressive stretching could cause pain and tissue damage[13]. At a later stage, to avoid recurrence, the brace is used for shorter period .

If the deformity can only be reduced passively, with place ment of the wrist or metacarpophalangeal joint in flexion, it can

be assumed that the structure responsible for contraction crosses the joints above the flexor surface. The possibilities are that the lumbrical muscle has an abnormal origin or insertion, or that the superficial flexor is abnormally fixed. Surgery to treat camptodactyly, especially in cases of severe contracture, has several complication, such as lesions of neu rovascular structures, scar tension during extension and loss of flexion. Incomplete extension is better tolerated than deficient flexion. Early mobilization should be instituted in order to promote restoration of flexion.8,10 The return of the set of movements of the deep flexor of the fingers and the proximal interphalangeal joint is slow and may take six to twelve months in patients who are treated surgically.

5. CONCLUSION

As a result of our research, we have concluded that patients who present to us at an early age have a better prognosis than those who present at a later age. Also less angle deformity have a better prognosis than those big , If a patient appears at a younger age, surgical correction will be easier, with less tissue manipulation and a lower need for repeat surgery. However, more cases is need and also fingers grip (function) complications is suspected in some cases post operative .

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