

Correction of Thumb-in-Palm Deformity in an Adult Patient with Cerebral Palsy: A Different Indication and a Different Approach

Serebral Palsili Yetişkin Bir Hastada Thumb-in-Palm Deformitesinin Düzeltilmesi: Farklı Bir Endikasyon ve Farklı Bir Yaklaşım

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Abstract

Thumb-in-palm deformity in patients with cerebral palsy is functionally disabling because of lacking thumb motion. The major reasons for selecting surgical treatment are to effect improvement in the performance of thumb activities and to produce aesthetic appearance so that it no longer interferes with the function of the other digits. However, this deformity as itself in Turkish culture is so close to an abusive act which can be defined as shaking of the hand with the thumb hidden in palm or in the second web space. A 34 year old male patient, whose main complaint was the position of his thumb being misunderstood by other people as an abusive gesture, was consulted to our clinic. Web-space releasing, myototomy, and tendon transfer operations were performed simultaneously. The patient gained grasping function by maintaining his thumb out of his palm. Communicative skills were improved and better hand hygiene was acquired.

Keywords: hand, thumb-in-palm deformity, indications

Özet

“Thumb-in-palm” deformitesi olan serebral palsili hastalarda, baş parmak hareketlerindeki kayıp nedeniyle fonksiyonel bir eksiklik söz konusudur. Cerrahi tedavideki en önemli amaçlar baş parmağın estetik görünümü ve fonksiyonunun daha iyi bir hale getirilerek diğer parmakların hareketlerine engel teşkil etmemesidir. Bununla beraber baş parmağın avuç içindeki veya ikinci parmak aralığındaki fikse pozisyonu, Türk toplumunda kültürel olarak küfür veya hakaret anlamına da gelebilmektedir. Otuzdört yaşındaki bir erkek hasta kliniğimize baş parmağının avuç içindeki pozisyonunun diğer insanlar tarafından yanlış anlaşılma şikayeti ile başvurdu. Hastaya aynı seansta birinci parmak aralığı serbestleştirilmesi, miyonötomi ve tendon transferi işlemi yapıldı. Böylece toplum içindeki iletişimi ve el hijyeni daha iyi bir hale geldi.

Anahtar Kelimeler: El, “thumb-in-palm” deformitesi, endikasyonlar

Introduction

The thumb-in-palm is a significant deformity that is frequently found in children with cerebral palsy.

The flexed and adducted thumb in the palmar space is displeasing and functionally disabling. During digital extension, it blocks the entry of objects into

the palm, thereby interfering with the functional activity of the remaining digits. During digital flexion, it is poorly positioned for effective grasp since it precedes the other digits into the palm; that is, the thumb is clenched inside the first rather than outside the other fingers. On each attempt to pinch, the thumb fits in, under, or between the fingers, most frequently between the second and third digits (1). This uncontrollable pathologic motor automatism that cause problems related to hygiene can make the hand functionless (2). The deformity is primarily due to spasticity of the flexor pollicis longus, flexor pollicis brevis, adductor pollicis, and first dorsal interosseous, as well as weakness of the extensor pollicis longus, extensor pollicis brevis, and abductor pollicis longus muscles. Surgical reconstruction may be indicated to improve function or to facilitate hygiene with the aim of creating a stable thumb, removed from the palm that is able to function satisfactorily for grasp and release (3). We would like to share a different indication and a different approach for the correction of thumb-in-palm deformity other than the ones known by our colleagues.

Case Report

Recently, a 34 year old male patient attended to our clinic with a thumb-in-palm deformity due to cerebral palsy. The main complaint of the patient was the position of his thumb being misunderstood by other people and recognized as an abusive gesture. He told us that he had been violated by the mean of this misunderstanding several times. Although he had a deformity that impairs his hand functions, the patient did not complain about maintaining hand hygiene and active thumb movement for pinching and grasping. Several operations were performed in another hospital to correct his thumb and other digits' position before consulting to our clinic. However, we could not

obtain detailed information regarding these operations. On physical examination; (1) in the resting position, the thumb was lying flexed and adducted into the palm (Fig. 1), (2) active extension and abduction of the thumb was totally absent while the other four digits could extend to some degree, (3) during forced extension and abduction, first web space was contracted and flexor pollicis longus tendon was shortened.

A dynamic approach including three steps was planned for correction of the thumb-in-palm deformity in one stage:

Step I: A five-flap z-plasty to deal with the skin and fascial contractures of the first web-space.

Step II: Myototomy of adductor pollicis muscle to allow a relative lengthening of the tendon while preserving bundles of muscle fibers to maintain some adductor function.

Step III: Flexor pollicis longus tendon transfer to the radial side of the distal phalanx of the thumb to release flexor spasticity and to maintain thumb abduction.

During the operation, after completing step I and II, we noticed that extensor pollicis longus tendon continuity was disrupted. This was thought to be related with previous surgical procedures which might be extensor pollicis longus rerouting or tenodesis for metacarpophalangeal joint stabilization. For this reason, we decided to transfer flexor pollicis longus tendon to the dorsal side of the distal phalanx of the thumb. We did not perform any bone stabilizing procedure because of the metacarpophalangeal joint stability. Following the completion of the procedures the forearm and hand were immobilized for four weeks with the thumb held in abduction and extension by a volar splint. Removable splinting was continued for 2 weeks in accordance with an exercise program to maintain the thumb out of the palm during fist formation.

There were no complications in the early postoperative period. The operation lessened thumb flexion and adduction and improved thumb extension and abduction. The thumb was no longer held clenched in the palm (Fig. 2). The patient was able to use the operated hand for assistive grasp; however, ability to use the hand for manipulation of small objects and for pinch was not improved. By doing so, the patient was able to maintain hand hygiene and shake the hands which meant that he improved his communicative skills. In the follow-up period of one year, hyperextension of the distal phalanx of the thumb was noticed. Surgical correction was proposed but declined by the patient since he was satisfied with the result.

Discussion

Thumb-in-palm deformity is a result of the lack of normal balance between agonists and antagonists and failure of the normal reciprocal innervation in the spastic muscles. It is caused by a lifelong hypertonicity of the adductor pollicis muscle, the flexor pollicis brevis muscle, and sometimes the flexor pollicis longus muscle, in combination with the paresis of the extensor pollicis longus muscle, the extensor pollicis brevis muscle, and the abductor pollicis longus muscle. This muscle imbalance, resulting from combinations of spasticity and/or weakness, produces the deformities observed (4). The classification of the deformity was described by House et al. (5). In type 1, intrinsic deformity, there is spasticity of the intrinsic thumb muscles causing adduction of the thumb metacarpal, flexion of the metacarpophalangeal joint, and extension of the interphalangeal joint. In type 2, extrinsic deformity, there is spasticity of the extrinsic thumb flexor (flexor pollicis longus) causing flexion of the metacarpophalangeal and interphalangeal joints. In type 3, combined deformity, there is

spasticity of both the intrinsic and extrinsic thumb muscles. The flexor pollicis longus, adductor pollicis, first dorsal interosseous, and flexor pollicis brevis muscles are all involved to some extent, and the abductor pollicis longus, extensor pollicis brevis, and extensor pollicis longus are relatively paretic. The metacarpal is adducted and the metacarpophalangeal and interphalangeal joints are flexed giving a true thumb-in-palm deformity (3). Our patient had metacarpal adduction contracture combined with metacarpophalangeal and interphalangeal flexion deformities and was classified as a Type 3 deformity. The thumb-in-palm deformity should be surgically corrected since it not only interferes with the grasping and pinching function of the thumb, but also blocks the palmar space and prevents the hygiene of the hand. However, the thumb-in-palm deformity as itself in Turkish culture is so close to an abusive gesture which can be defined as shaking the hand with the thumb hidden in palm or in the second web space. His main complaint was the position of his hand which has been misunderstood by other people and recognized as an abusive gesture. Since not all patients benefit from surgical correction because of the variations of the thumb in palm deformity, procedures must be individualized (6). Based on the severity of the deformity, the principles to be kept in mind are the releasing of the deforming muscles, augmentation of the weak muscles, and skeletal stabilization (7). These steps are usually carried out during the same operation (2,5,8). Our primary objectives in surgical correction of the deformity in our patient are to repose the thumb, achieve thumb free palmar space, and to improve grasping function. We demonstrated that a good and lasting result was achieved by lengthening the first web space by a five-flap z-plasty, releasing of the adductor pollicis muscle.

As a conclusion, in reconstruction of thumb-in-palm deformity, not only the functional restrictions but also the difficulties in social life should be kept in mind. In Turkish culture, it is unacceptable for other people to have someone



Figure 1: Preoperative appearance of thumb-in-palm deformity in resting position

keeping his thumb in palm or between his 2nd and 3rd fingers. Therefore reconstruction of this deformity would provide functional restoration and ease the patient's acceptance by the public.



Figure 2: Late postoperative result, effective grasping function was improved

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