

## Delayed Correction of Congenital Torticollis with Modified Bipolar Release

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### Abstract

Torticollis refers to the congenital deformity caused due to shortening of the sternocleidomastoid muscle. The treatment of such a condition is usually surgical. It involves a bipolar release of the contracted muscle. Ferkel modified the bipolar release with a Z lengthening, thus maintaining the continuity of the muscle and preserving the 'V' contour of the neck. The aim of this paper is to highlight this modified bipolar release.

Fourteen patients with a mean age of  $9.6 \pm 6.9$  years were treated for congenital torticollis with modified bipolar release. There was improvement in head tilt and chin deviation in all patients. This small additional step during the surgical release helps to improve the aesthetic appearance postoperatively. Craniofacial asymmetry improves even if surgery is delayed.

**Keywords:** *Torticollis; Bipolar release; Z lengthening; Sternocleidomastoid; Asymmetry*

### 1. Introduction

Torticollis refers to congenital shortening in one side of the neck, resulting in a typical attitude of the head. The head tilts to the affected side and the chin deviates to the unaffected side. The etiology of torticollis is unclear with the most commonly accepted theory being a vascular insult to the sternocleidomastoid muscle. This results in a compartment syndrome like picture with subsequent fibrosis of the muscle [1].

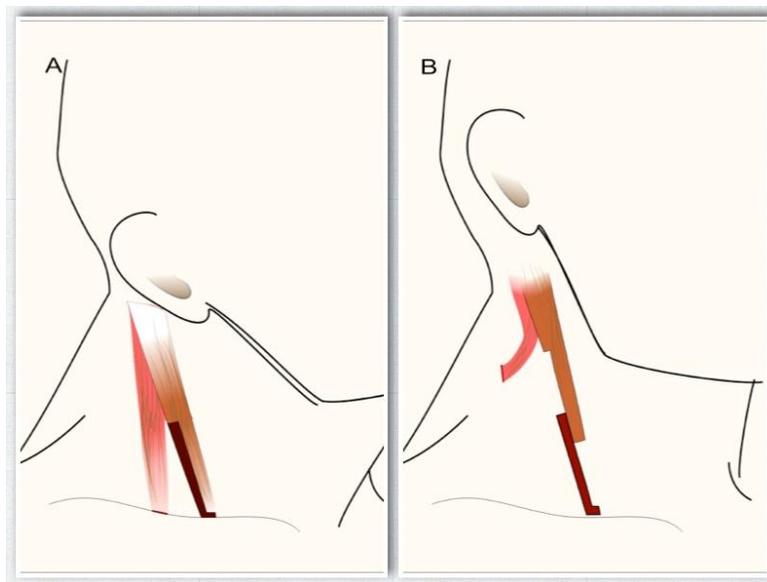
Torticollis may initially be managed by physical therapy. Patients presenting late, or those who fail to get corrected with physical therapy, are managed surgically. Surgical correction of torticollis, the bipolar release, involves division of the fibrosed sternocleidomastoid muscle along with any associated soft tissue tethering. The release is optimally performed before five years of age. Ferkel [2] described a 'Z' lengthening of the muscle along with the bipolar release. The advantage of this

refinement is that it improves the appearance to the neck after surgery. In this paper, we aim to highlight this modified bipolar release, performed in an advanced age.

## 2. Patients and Methods

### 2.1 Surgical technique

The procedure is performed under general anaesthesia, with the patient in supine position and neck supported. The superior incision is made at the tip of mastoid. The sternocleidomastoid muscle is identified and divided. Care should be taken to preserve the facial nerve, coming out of the stylomastoid foramen as well as the spinal accessory nerve. Another incision is made 1 cm above the clavicle, to expose the clavicular and the sternal heads. The clavicular head is completely divided. The sternal head is divided in a 'Z' fashion as shown in FIG. 1. Additional release of adjacent soft tissue may be required to completely release the tightening. Once complete release is attained, the ends of the divided sternal head are sutured, effecting a lengthening. Hemostasis is attained and the wound is sutured in layers. Splintage is given for six weeks. A plaster of paris splint is fashioned such that the repaired muscle lies in full stretch. The chin after immobilization points towards the ipsilateral shoulder. Sutures are removed after ten days. The splint can be converted into a thermoplastic splint and intermittent mobilization is done after four weeks. After six weeks, splintage is removed and full mobilization is allowed.



**FIG. 1. Diagrammatic Representation of the Procedure. The Sternal head is divided in a Z fashion and sutured after elongation.**

## 3. Results

During the period of January 2015 to December 2018, modified bipolar release was performed in 14 patients with congenital torticollis. The mean age was  $9.6 \pm 6.9$  yr. There was improvement in head tilt and chin deviation in all patients. No wound complications or nerve palsies were encountered in our series. Due to the Z lengthening of the muscle the continuity of the muscle was maintained. This helped to preserve the aesthetic 'V' shape of the neck. (FIG. 2) There was improvement in the craniofacial asymmetry post release of the muscle.



**FIG. 2. Clinical photograph showing pre-operative (a,b) and one year post-operative (c,d) status. Note the prominent sternocleidomastoid post-operatively. Mild facial asymmetry present, which is still present post-operatively.**

#### **4. Discussion**

Treatment of torticollis consists of physical therapy and surgery. Physical therapy is the first line of management of torticollis. Physical therapy performed upto one year of age, reduces the severity of torticollis and improves the overall surgical outcome. One to four years of age is the optimal time for surgery [3]. With early surgical release the sequelae like craniofacial asymmetry [4], cervical spinal anomalies and strabismus may be avoided. The eventual outcomes worsen significantly if the deformity is left uncorrected after five years of age [5]. Sudesh et al. [6] reported acceptable results in children older than ten years of age also. The mean age of surgery in our series was  $9.6 \pm 6.9$  yrs. Many patients presented late, after the optimal time for surgery. The reason for this is the lack of awareness of torticollis as an entity and the associated craniofacial asymmetries. Most of the parents arrive for surgery once the child is growing up and the deformity has started worsening.

Thus, patients even after surgery were expected to have some residual deformity. The goal of surgery is to correct the deviation of the chin and the neck tilt. It involves release of the sternocleidomastoid, either at one end or both. Unipolar release is usually preferred for younger patients with mild deformities. Even then there is higher chance of recurrence of deformity following unipolar release [7]. Bipolar release is the standard treatment of torticollis.

The outcomes of torticollis surgery are usually measured in terms of improvement in the neck movement [8]. While this primary aim of the procedure is undoubtedly fulfilled, the contour of the neck is lost. Z lengthening of the sternocleidomastoid muscle bridges the length of the neck, from the mastoid to the sternum. This helps in 'framing' of the neck and gives an aesthetic appearance to the neck. Ellenbogen described visible anterior border of the sternocleidomastoid as one of the six criteria for a youthful and aesthetic neck [9]. This can be preserved by this modification of Ferkel. In long standing torticollis there may be severe shortening where release takes priority over contour preservation and suturing of the cut ends may have to be avoided. Facial asymmetry is usually associated in patients with torticollis. Usually, this asymmetry is noted only when pointed out by the surgeon, to the patient's family. Treatment is not required for managing this asymmetry per se. This asymmetry improves

following the release of torticollis [10]. Delayed surgery results in a higher degree and severity of facial asymmetry, which may not correct fully. It is noted that this asymmetry improves over time, even if the initial operation was at a later age (FIG. 3). This reinforces that even in cases presenting late, there is a role of surgery in improving craniofacial asymmetry.



**FIG. 3. Clinical photograph showing long term changes after torticollis. Pre-operative (a) and five-year post-operative (b) comparison shows marked improvement in facial asymmetry is possible, even after late surgery.**

## 5. Conclusion

With this case series we aim to highlight the role of ‘Z’ lengthening with bipolar release of sternocleidomastoid in torticollis. This ‘Z’ lengthening maintains the contour of the sternocleidomastoid and maintains the aesthetic appearance of the neck. Patients operated late have definite but incomplete improvement in deformity.

## 6. Funding

None

## 7. Conflict of Interest

The authors declare that they have no conflict of interest.

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