

2. Abstract

Cleft palate is one of the most frequent congenital malformations. The complexity of these conditions requires surgical treatment in several stages. The first stage includes reconstruction of the nose and the lip, and timing is either shortly after birth, or, in about two thirds of centers worldwide this surgery is performed at the age of 3 months. The next stage, palate defect repair, is timed at around 9 months of age, and the final reconstruction of the maxilla is done based on the permanent canine eruption at about 8 years of age. The main objective of our study was to estimate the pros and cons of early surgical approach after introducing a novel modified surgical protocol versus the conventional surgical protocol. The 5 main findings include:

1. A novel surgical procedure to repair neonatal cleft lip was developed, incorporating modification of Tennison protocol by adding flaps acquired from the margins of the cleft. An important contribution is a shorter time both under anesthesia and in the theatre, and resulting reduction of hospital stay from 7–8 days down to 3–4 days.
2. We have compared the biochemical parameters of the surgical wound healing – matrix metalloproteinases (MMP) and their inhibitors (TIMP) in the group of children having surgery early in neonatal age and in children having surgery at the age of 3 months. No difference in MMP levels was found, but significantly lower level of TIMP-1 was found in the dermis of children operated in early neonatal age, which is indicative of raised MMP/TIMP ratio. It is known that in scar-free healing the tissues have higher MMP/TIMP ratio.
3. We have assessed the cosmetic appearance of the scar after lip repair in neonates versus in children who had surgery at the age of 3 months or later. We have found that the appearance of the scar after surgery in early neonatal age was significantly better.
4. We have monitored the development of maxilla in individuals with complete unilateral cleft in 3D models made prior to the neonatal cheiloplasty and around 1 year of age. The patients with unilateral cleft palate do not develop undesirable narrowing of the dentoalveolar arch.
5. We have performed a PCA and FESA facial shape analysis on 3D facial scans in two groups of children at around 6 years of age, a group of children with complete unilateral cleft lip and palate treated with neonatal cheiloplasty, and a control group. When comparing our group of patients with literary data on the patients operated later in life, both groups showed similar differences from controls.

This thesis suggest that after early lip reconstruction using our novel surgical protocol there is an evidence of faster healing with better aesthetic outcome. The mother leaves maternity hospital with a child without facial defect, which results in improved quality of life for both the infant and the family.