

## Original Article

# Management of cleft lip and palate in Egypt: A National survey

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### ABSTRACT

**Background:** Variable protocols for the management of cleft lip and/or palate (CLP) patients are currently used. However, to our knowledge, there are no previously published data about cleft management and practice in Egypt. **Materials and Methods:** One-hundred questionnaires were distributed to cleft surgeons attending the annual meeting of the Egyptian Society of Plastic and Reconstructive Surgeons in March 2016 to investigate timing, techniques and complications of cleft surgery. Seventy-two colleagues returned the questionnaire, and the data were analysed using Microsoft Excel software. **Results:** The majority of cleft lip cases are repaired between 3 and 6 months. Millard and Tennison repairs for unilateral cleft lip, while Millard and Manchester techniques for bilateral cleft lip are the most commonly performed. Cleft palate is usually repaired between 9 and 12 months with the two-flap push-back technique being the most commonly used. The average palatal fistula rate is 20%. Pharyngeal flap is the method of choice to correct velopharyngeal incompetence. Polyglactin 910 is the most commonly used suture material in cleft surgery in the country. Multidisciplinary cleft management is reported only by 16.5% of participants. **Conclusion:** Management of CLP in Egypt is mainly dependent on personal preference, not on constitutional protocols. There is a lack of multidisciplinary approach and patients' registration systems in the majority of centres. The establishment of cleft teams from the concerned medical specialties is highly recommended for a more efficient care of cleft patients.

### KEY WORDS

Cleft lip and palate; cleft management; cleft survey; Egypt; multidisciplinary cleft clinic

### INTRODUCTION

Cleft lip and/or palate (CLP) is the most common congenital anomaly in the head-and-neck region.<sup>[1]</sup> The complex care of cleft patients requires a team

work of different specialties including nursing services, plastic surgery, speech pathology, orthodontics, audiology, paediatrics, anaesthesiology, dentistry, otolaryngology, psychology and genetics.<sup>[2]</sup> Evaluation

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of treatment results of cleft patients must consider the effects on growth, the function, the appearance and the psychological outcome.<sup>[3]</sup>

There is currently a large variation between different institutes and centres worldwide in the protocol of cleft management. The timing of surgery and the surgical techniques used for cleft repair are quite different.<sup>[3]</sup> For instance, in a survey including the European cleft centres (2001), 194 different surgical protocols were reported to be used for primary repair of unilateral complete cleft lip.<sup>[4]</sup> However, little is known about the practice of cleft care in many African and Middle Eastern countries including Egypt. To our knowledge, there is no previous survey undertaken in Egypt to explore and assess the current management of cleft lip and palate.

The purpose of this survey is to investigate the current cleft practice in Egypt. This includes the management protocols, the timing of surgery, the different surgical techniques and sutures used in cleft lip and palate repair. Furthermore, the caseload and the presence of multidisciplinary approach were investigated.

## MATERIALS AND METHODS

In March 2016, 100 questionnaires were distributed to the surgeons attending the winter annual meeting of the Egyptian Society of Plastic and Reconstructive Surgeons. They represent university hospitals, the major ministry of health hospitals and military hospitals.

The questionnaire was concerned with data regarding the management protocol (surgical timing, surgical techniques and sutures) used, the caseload of patients per year and the clinical specialties involved in cleft treatment.

## RESULTS

Seventy-two questionnaires were returned: 62 from colleagues working in university hospitals, 7 from colleagues working in major hospitals affiliated to the ministry of health and the other 3 responses from colleagues working in a major military hospital. Out of the 72 responding surgeons, 67 were plastic surgeons, 3 were maxillofacial surgeons and 2 were paediatric surgeons.

### Surgical timing

Unilateral cleft lip is repaired by the majority (75%) of participants by the age of 3 months, while 12.5% perform the repair earlier in the 1<sup>st</sup> and 2<sup>nd</sup> months of life and another 12.5% perform it after 3 and up to 6 months (>3–6 m). Likewise, the majority of surgeons (77.8%) repair bilateral cleft lip at the age of 3 months although 5.6% do it in the first 2 months of life and the remaining 16.7% do it after 3–6 months. In bilateral cleft lip, 50% of surgeons repair both sides in one stage and the other 50% perform the repair in two stages.

Regarding cleft palate, 50% of surgeons do the repair at approximately 9 months of age and the other 50% repair it at the age of 12 months. The majority (83.3%) of surgeons repair the soft and hard palate in the same procedure while 16.7% of them repair it in two stages: 11.1% perform the soft palate first and 5.6% perform the hard palate first. The second stage of repair is performed after 6–12 months.

### Surgical techniques

The most common technique of unilateral cleft lip repair is the rotation-advancement technique of Millard or its modifications, used by 75% of participants, while 19.4% use Tennison technique and the remaining 5.6% use other techniques including the straight line one. As regards bilateral cleft lip repair, 68% of surgeons use Millard technique while 32% prefer Mulliken technique. Most of the participants (80.5%) stick to one technique while 19.4% of them use more than one technique according to the given situation. Lip adhesion procedure is rarely practiced, being routinely performed by only 12.5% of surgeons, while 36.1% of participants have done it sometimes and the majority (51.4%) have not done it at all.

Two-thirds of participants (66.7%) perform primary nasal correction at time of cleft lip repair; the majority of them (56.3%) use closed alar dissection and fixation technique, 33.3% use bolstered sutures and 10.4% use open rhinoplasty technique.

The most popular techniques used to repair cleft palate are the two-flap push-back technique, performed by 45.8% of the participants, and the Bardach technique, used by 29.2%, followed by the Furlow's double opposing Z-plasty technique, performed by 15.3%, and the von Langenbeck technique, used by 9.7% of the participants. Half of the responding surgeons use only one technique for repair of all cleft palate patients, whereas 19.4% use two different

techniques and 30.6% use more than two techniques for cleft palate repair.

Regarding alveolar bone graft, only 18.1% of the responding surgeons perform it as a routine procedure in all alveolar cleft patients, 70.8% of participants have used it sometimes, while 11.1% have never used it. Alveolar bone graft is usually performed between the ages of 7 and 9 years. Primary gingivoperiosteoplasty at time of cleft lip repair is practiced by 58.3% of participants while 41.7 of them have never performed it.

**Suture materials**

Polypropylene suture is used by 67% of participant surgeons to repair the skin in cleft lip patients while 16.5% of them prefer polyglactin 910 sutures and the other 16.5% prefer polyglactin 910 rapide. Regarding the size, 6/0 sutures are used for lip skin by 61.1% of surgeons, 5/0 sutures are used by 29.2% and the remaining 9.7% use 4/0 sutures. Muscle repair is performed using polyglactin 910 by 67% of the participant surgeons while the other 33% use polydioxanone sutures. As regards the suture size, 72.2% of the participants use 4/0 sutures while 27.8% prefer 5/0 sutures. In cleft palate repair, 68.1% of surgeons use polyglactin 910 while 25% prefer polydioxanone and only 6.9% use silk sutures. Most surgeons (87.5%) use 4/0 sutures for the palate, but a small percentage (12.5%) prefer 5/0 sutures.

**Post-repair palatal fistula rate**

The majority (45.8%) of the participant surgeons reported a fistula rate ranging from 10% to 20% of cases, while 37.5% reported a rate less than 10%. Higher fistula rates up to 30% were reported by 8.3% of participants and another 8.3% of them reported a fistula rate up to 40%.

**Velopharyngeal incompetence**

Most of the participant surgeons (87.5%) refer patients with velopharyngeal incompetence (VPI) to speech pathologists and they stated that speech assessment is the principal and only tool used to evaluate the velopharyngeal function in their centres. Methods used for the management of VPI are summarised in Table 1.

**Cleft teams and multidisciplinary management**

More than half of the participant surgeons do not have organised cooperation with other specialties involved in the management of cleft, while 33% of them have scheduled multidisciplinary meetings with other cleft-oriented medical specialties, namely speech pathology,

orthodontics, paediatrics, audiology, otolaryngology and dentistry. The presence of a specialised cleft clinic with a team consisting of at least two medical specialties beside the cleft surgeons was reported by only 11.1% of participants.

**Caseload per year**

Out of 20 centres contributed in the questionnaire, we could only collect the data regarding caseload per year for 12 centres because some participants did not answer that part of the questionnaire. The caseload per centre per year ranged from 29 to 384 cases [Table 2]. The total number of patients operated in all cleft centres across the country was 921 primary surgeries per year with total of 1634 per year including primary and secondary cases.

**DISCUSSION**

This survey tried to find the different adopted protocols for the management of cleft lip and palate patients in Egypt. The survey included surgeons representing various healthcare providers in Egypt. The majority of participants were affiliated to the university hospitals in Egypt. These university hospitals carry out a major portion of the healthcare burden, especially in higher specialised disciplines as plastic surgery which is rarely available in the hospitals of the ministry of health. Thus, the results of the survey can be considered to be representative of the actual current situation of cleft care in the country.

In the current study, all participant surgeons perform the repair of cleft lip under the age of 6 months. The Millard technique is the method of choice in both unilateral and bilateral cleft lip. This is consistent with the findings of Sitzman *et al.* concluding that Millard technique and its modifications represent the preferred method by 84% of surgeons in the United States and Canada for unilateral cleft lip repair.<sup>[5]</sup> In the repair of bilateral cleft lip, our results are similar to what was reported by Tan *et al.* in their survey of surgical management of bilateral

**Table 1: Methods used to correct velopharyngeal incompetence**

| <i>Surgical procedure for VPI</i>                | <i>Percentage of participants using it</i> |
|--|--|
| Superiorly-based pharyngeal flap                 | 25   |
| Pharyngoplasty                                   | 25   |
| Palatal re-repair with radical muscle dissection | 20   |
| Palatal re-repair without muscle dissection      | 10   |
| Furlow's palatal lengthening                     | 10   |
| Buccinator flap                                  | 10   |

VPI: Velopharyngeal incompetence

**Table 2: The average caseload of various cleft problems per centre per year**

| <b>Surgical Procedures</b> | <b>Centre 1</b> | <b>Centre 2</b> | <b>Centre 3</b> | <b>Centre 4</b> | <b>Centre 5</b> | <b>Centre 6</b> | <b>Centre 7</b> | <b>Centre 8</b> | <b>Centre 9</b> | <b>Centre 10</b> | <b>Centre 11</b> | <b>Centre 12</b> | <b>Total</b> |
|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|--------------|
| Primary cases              | 48              | 120             | 24              | 48              | 24              | 24              | 150             | 75              | 12              | 240              | 144              | 12               | 921          |
| Secondary lip              | 24              | 24              | 12              | 24              | 36              | 24              | 20              | 15              |                 | 60               | 10               | 4                | 253          |
| Palate fistula             | 12              | 12              | 0               | 12              | 12              | 24              |                 | 20              | 12              | 12               | 10               | 2                | 128          |
| VPI                        | 4               | 12              | 0               | 6               | 6               | 12              | 10              | 20              | 12              | 12               | 10               | 2                | 106          |
| Rhinoplasty                | 1               | 36              | 10              | 4               | 24              | 12              |                 | 9               |                 | 36               |                  | 5                | 137          |
| Alveolar bone graft        | 3               | 0               | 0               | 0               | 6               | 12              |                 | 6               | 12              | 12               | 6                | 4                | 61           |
| Orthodontics               | 9               | 0               | 0               | 0               | 0               | 0               |                 | 1               |                 | 12               | 6                |                  | 28           |
| <b>Total</b>               | <b>101</b>      | <b>204</b>      | <b>46</b>       | <b>94</b>       | <b>108</b>      | <b>108</b>      | <b>180</b>      | <b>146</b>      | <b>48</b>       | <b>384</b>       | <b>186</b>       | <b>29</b>        | <b>1634</b>  |

VPI: Velopharyngeal incompetence

cleft lip in North America who have found that Millard technique is the most common method (38%), followed by Mulliken (26%) and Manchester (12%).<sup>[6]</sup> Regarding to staging of the bilateral cleft repair, our report showed that half of the participant surgeons perform one-stage repair of bilateral cleft lip, and this was similar to the findings of the Eurocleft project published in 2001.<sup>[4]</sup>

Lip adhesion is not a common procedure in Egypt: only 12.5% of surgeons are practicing it. It has been reported that 4% of surgeons in the United States and Canada routinely perform lip adhesion in patients with unilateral complete cleft lip and 11% of them use preliminary bilateral lip adhesion before formal repair of bilateral complete cleft lip.<sup>[5,6]</sup>

The majority of Egyptian surgeons (66.7%) perform primary nasal correction with cleft lip repair as opposed to 52% of the American and Canadian surgeons.<sup>[5,6]</sup>

In our study, we found that all surgeons perform palate repair between the ages of 9 and 12 months. This is slightly different from the cleft palate repair survey conducted in the United States by Katznel *et al.* which showed that 85% of surgeons perform palate surgery when the patient is between 6 and 12 months of age.<sup>[7]</sup> In our study, the most frequent technique used by the participants to repair cleft palate is the two-flap push-back technique, followed by the Bardach technique. This is different from the above-mentioned American report, which reported the use of two-flap technique with intravelar veloplasty as the most common method (45%) followed by Furlow's double opposing Z-plasty (42%).<sup>[7]</sup> The same report showed that 96% of American surgeons perform a one-stage palate repair, whereas our study shows a bit lower percentage 83.3%. Alveolar bone grafting is not a frequently performed procedure in our country: only 18.1% of surgeons perform it routinely for all alveolar cleft patients, while primary gingivoperiosteoplasty at the

time of cleft lip repair is found to be popular procedure done by 58.3% of the participants. The few number of surgeons performing alveolar bone grafting is indication the lack of long-term patients' follow-up.

Evaluation of VPI in Egypt is mainly dependent on speech assessment alone, as nasoendoscopy and fluoroscopy are not available in all centres. In contrast, a survey on the members of the craniofacial society of Great Britain and Ireland in 2015 revealed that videofluoroscopy and nasendoscopy were the most frequently used methods of assessing and diagnosing VPI in cleft patients.<sup>[8]</sup> The current survey showed that the most commonly used techniques to correct VPI in Egypt are superiorly based pharyngeal flap followed by palatal re-repair, pharyngoplasty and Furlow's palatal lengthening, while palatal re-repair was the most frequently utilised technique in Great Britain and Ireland, followed by Hynes pharyngoplasty and Furlow's technique.<sup>[8]</sup>

Cleft patients need specialised multidisciplinary management from birth till maturity.<sup>[3]</sup> Multidisciplinary management is widely recognised as the preferred form of care of cleft lip and palate.<sup>[9,10]</sup> The royal college of surgeons of England recommended that cleft patients should have access to a comprehensive service including the full range of the concerned specialties.<sup>[11]</sup> However, the current survey indicates the paucity of multidisciplinary cleft teams for delivery of care for cleft lip and palate patients in Egypt.

We found a wide variation in the caseloads per centre, but these differences can be explained by the particular region in which the centre is situated and the population density around each centre. Furthermore, the number of cleft surgeons and the availability of facilities for cleft surgery in each given centre are critical determinants of the number of patients served. Some centres have a limited number of cleft cases per surgeon per year.

However, these numbers are mostly subjective estimates and not the exact caseload. In most hospitals, there is no accurate registration system for the patients, and even in the few centres that have such system, it is usually recently introduced and enabled only for the recent admissions, but obtaining old data of patients' admission is still a difficult job.

There has been increasing evidence from multicentre studies that decentralised cleft care may be associated with inferior outcomes, especially by low-volume operators.<sup>[12]</sup> This, in turn, results in greater suffering for patients and increases the healthcare cost due to additional surgeries and hospital admissions.<sup>[4]</sup> Many reports support the move toward fewer, high-volume operators which could be achieved by a higher degree of intra speciality referrals and it has been stated as an aim of the British Association of Plastic Surgeons in 1994 that cleft surgery should not be carried out by the occasional operator and that cleft teams should be centred in larger units so that expertise can be concentrated from treating significant numbers of patients.<sup>[10,13]</sup> However, our survey showed that the management of cleft patients in Egypt is provided by large numbers of local hospitals and the majority of surgeons work in isolation. Not surprisingly, we found that different surgeons in the same hospital often practice different techniques.

In this study, all the responding surgeons use absorbable sutures to repair the muscles of the lip: two-thirds of them use polyglactin 910 and the other one-third uses polydioxanone. For the palatal muscle repair, 93.1% of participants use absorbable sutures while 6.9% of them use non-absorbable sutures. A little can be found in literature about the effects of the suture material or size on the outcome of the repair results. However, Sommerlad has stated that there is no difference between different types of sutures used to repair palatal muscles and he stated 'I have always used nylon because it is monofilament, non-reactive and reliable and as long as they are cut short enough, I have not had problems with them and if I did not use nylon or Polypropylene, I would use Polydioxanone' (personal communication, January 2017).

Post-repair palatal fistula is the most common early complication after palatal surgery with a variable incidence reported by different studies. Cohen *et al.* stated that the incidence of oronasal fistulae varies from 4% to 35%.<sup>[14]</sup> A more recent study reported a fistula rate

as high as 68%.<sup>[15]</sup> Our results are very similar to Cohen *et al.* as we found the fistula rate ranging from <10% up to 40%.

There are 15 university hospitals in Egypt which carries the major burden of care for free medical service and much fewer hospitals affiliated to the Ministry of Health and Army. This survey included at least 20 centres, which means that there was well representation of the major governmental hospitals in Egypt. However, the total number of the primary cases in the current survey was 921. In Egypt, the birth rate is approximately 30 births per 1000 population.<sup>[16]</sup> It is expected to have >3000 new cleft cases per year (considering the total population is around 90,000,000 and the incidence of cleft is 1/750 live birth). This means that big portion of cleft cases is treated in private sector in Egypt. Furthermore, only 24 cases of orthodontics were reported to be done, which is very few in relation the surgeries performed. This could indicate that significant number of cleft cases is not completing their orthodontic treatment or the orthodontic care of cleft patients is mainly centred in the private sector.

Action is needed to be taken to improve the outcome in cleft surgery. Multidisciplinary care should be encouraged by increasing the cooperation between different specialties, giving more attention for subspeciality in cleft surgery and encouraging subspeciality fellowship training. Development of a national cleft society can support these efforts through organising instructional courses and training workshops for the young doctors in different subspecialties of the cleft team.

## CONCLUSION

This study gives important information about the current national status of the management of cleft lip and palate in Egypt. The results show wide variation in many aspects of cleft management. Even within the same hospital, there are often interpersonal variations in the protocols and surgical techniques used. We recommend the establishment of multidisciplinary cleft team and clinic in every major health facility involved in the management of cleft lip and palate patients. This team should include at least a speech pathologist, an orthodontist, an audiologist and paediatrician, beside the cleft surgeon. It is also recommended that regional cleft centres should be established in Egypt for a more effective and comprehensive care of cleft lip and palate patients.

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## Conflicts of interest

There are no conflicts of interest.

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