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Assessment of fractional CO2 laser in treatment of Post-surgical scarring of Cleft Lip

Thesis protocol

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قسم جراحة التجميل و الحروق
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تقييم الليزر ثنائي اكسيد الكربون الجزيئي في معالجة ندبة ما بعد عملية إصلاح الشفة الأرنبية

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Introduction

The carbon dioxide laser (CO2 Laser) was one of the earliest gas lasers to be developed. It was invented by Kumar Patel of Bell Labs in 1964. CO2 laser is the highest power continuous wave lasers that are currently available which produces a beam of infrared light with the principal wavelength bands centering on 9.4 and 10.6 micrometers. **Patel, C. K. N. (1964)**.

When CO2 beam of light is selectively applied to the skin, it heats and vaporizes various layers of skin, instantly treating damaged skin and wrinkles while smoothing out the surface of the skin. The skin remodeling occurs with new skin and collagen growth. The healing typically involves an open surface which takes weeks to heal and typically results in loss of the baseline pigmentation leading to variable lightening of skin. **Dover, J. S. (2012)**

Fractional CO2 laser resurfacing is a revolutionary delivery system that provides dramatic skin improvement without surgery. Matrix combines the benefits of CO2 laser by using microlaser columns "points of light" to treat the epidermis and dermal layers of your skin. **Bernstein et al (1997)**

Cleft lip is a form of lip malformation that occurs very early in pregnancy, the incidence of cleft lip in the population is approximately 0.5-2 in 1000 live births. Male children are affected more often than female children. **Michalski AM et al (2015).**

Cleft lips are usually picked up during the mid-pregnancy anomaly scan carried out when you're between 18 and 21 weeks pregnant. Not all cleft lips will be obvious on this scan and it's very difficult to detect a cleft palate on a routine ultrasound scan. **Mossey et al (2009)**.

Because each cleft is unique, definitive repair of the cleft lip should be individualized as Mirault, Le Mesurier, Tennison and Millard. **Stal S et al, (2009)**

Aims of the Work

- Evaluate the efficacy of fractional CO2 laser in the later appearance of cleft lip scar.
- Presenting this technique for the post-operative care schemes of cleft patients in academic trials.
- Accomplish parent's satisfaction.

Patients and Methods

This is a prospective comparative study on 120 patients divided to three groups, group A: 40 patients start laser treatment 3 weeks after surgical repair, group B: 40 patients start laser treatment 3months after surgical repair, group C: 40 patients as a control from 2017 to 2020 which will be conducted on patients with post-surgical cleft lip repair scarring. All patients will have 5-7 sessions with 4 weeks interval. Laser application would start after 8 weeks of the surgery without restricted age. Photographic documentation and evaluation of the scar will occur every 4 weeks.

Inclusion criteria:

- Any age with nice acceptable scar which would not need further revision.
- Eight weeks after repair with no hypertrophy, erythema or any other scar complication.

Exclusion Criteria:

- Any case with deformity needing further surgical interference

Preoperative data:

- Demographic data
- Type of surgery
- Age of repair
- Timing of applying the methodology

Procedure data:

- Parameters
- Intervals (every 4 weeks)
- No. of sessions (5-7)

Post-procedure Care:

- Type of used cream both in research and control groups
- Photography
- Methodology application
- Instructions

Photographic Documentation:

- Position (Ant. Post – Ant. Lateral – Dead Lateral)
- Before every session

Methodology Applications for evaluation of the scar:

- **Vancouver scar scale**
- **Visual Analogue Scale**
- **Scar Width Assessment**

Evaluation of the scar:

- **Vancouver Scar Scale (VSS)**
  The VSS, first described by Sullivan in 1990, is perhaps the most recognized burn scar assessment method. **Nedelec B et al, (2000).** It assesses 4 variables: **vascularity, height/thickness, pliability, and pigmentation.** Patient perception of his or her respective scars is not factored in to the overall score.

Vancouver scar scale		
	Scar Characteristic	**Score**
Vascularity	**Normal**	**0**
	Pink	**1**
	Red	**2**
	Purple	**3**
Pigmentation	**Normal**	**0**
	Hypopigmentation	**1**
	Hyperpigmentation	**2**
Pliability	**Normal**	**0**
	Supple	**1**
	Yielding	**2**
	Firm	**3**
	Ropes	**4**
	Contracture	**5**
Height	**Flat**	**0**
	<2mm	**1**
	2-5mm	**2**
	>5mm	**3**
	Total score	**13**

Visual Analogue Scale

This depends on 5 independent medical and nonmedical personel rating results on graded scale 0-10

Scar Width Assessment

This depends on studying the final images with Photoshop CS5 Extended Version in two fixed points of the scar width.

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