Pinnacle Medicine & Medical Sciences
ISSN: 2360-9516

http:/www.pjpub.org

Research Article Vol. 3 (3), 2016.

Presentation Of Old And New Histological Results After Plasma Exercises (Plexr) Application (Regeneration Of The Skin Tissue With Collagen III)

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Accepted 1 June, 2016.

ABSTRACT

This study was written after ten years of implementation of the innovative technique Plexr where it was found that this medical devices is the latest technology for Aesthetic Medicine and Aesthetic Therapy. This technique has been applied to thousand of patients who were completely happy with the results (treatments on the face or body). After the desired results in clinical presentation of the patient's, we wanted to test if histology presentation is consistent. The first histological study took place in University of Cheti (Italy): Rabbit model. The second and third one were examined by the Laboratory of Forensic Medicine and Toxicology in Athens Medical School (Greece) and Laboratory of Dr G. Gloustianou in her private clinic in Athens (Greece): human tissue.

Keywords: Plexr, biopsy, elastic fibres, histological, clinical, staining, skin, tissue, regenaration, collagen III.

Introduction

What is Plexr?

Plexr is a cordless micro-surgical hand operated device that transfers concentrated heat to the treated skin tissues. It uses the difference in voltage between the device and the patient's skin. The difference in voltage generates a small electrical arc, similar to a minute lighting. The small lighting causes the sublimation of the fluids contained in superficial part of the skin, without unwanted heat transmission to the adjacent tissues. Additionally it acts on the superficial layer of the skin preserving the lower layers; this will reduce drastically any potential permanent skin damage that could be caused by the misuse of conventional lasers.

Methodology

1st study:

Skin Lesions Induced From The Radiosurgical Unit And Voltaic Arc Dermoabrasion: A Rabbit Model.

(Scarano *et al*, 2011) Eight New Zeland male rabbits, each weighting about 3.9 Kg were used in this study. The animals were anesthetized with a dose of Ketamine and xylazine. The ketamine was used at a dose of 44 mg/Kg and the xylazine, a dose of 6-8 mg/Kg for kilogram of weight. Dorsal part of each rabbit was shaven and divided in two equal parts of 5 cm. Voltaic arc dermoabrasion. (Plexer, GMV s.r.l. Grottaferrata, Italy) on one side and radiosurgical unit (Laser elettronica Milano 1,75 MH) on the other were used to remove the keratinized layer. A total of 20 sites per rabbit were performed. The postoperative course was uneventful. All rabbits were sacrificed in groups of two with a Tanax overdose at Days: 0, 7, 14 and 21. The area of interest of the treated skin was removed by means of a scalpel and a block section containing the subcutaneous layer was retrieved.

There were obtained 20 biopsies from each block section, 10 performed with el- bras and 10 with radiosurgical unit for a total of 40 biopsies. A total of 160 sites were analysed, 80 with radiosurgical unit and 80 with voltaic arc microabrasion. The specimens were immediately fixed in 10% formalin and processed to obtain thin ground sections for histological analysis.

2nd study:

Clinical And Histological Presentation After PLEXR Application

(Tsioumas *et al*, 2015) Dr. ChorozidisIoannis (Dermatologist-Venereologist) took biopsy from the brachial region: a) we did xylocaine and adrenaline anesthesia around the area that is painted, without going into the dots of which will took biopsies (photo 1). b) At the bottom of the rectangle (photo 2) we took a sample for biopsy without applying the device. At the top (first spot) biopsy was taken immediately after applying Plexr (microspots).

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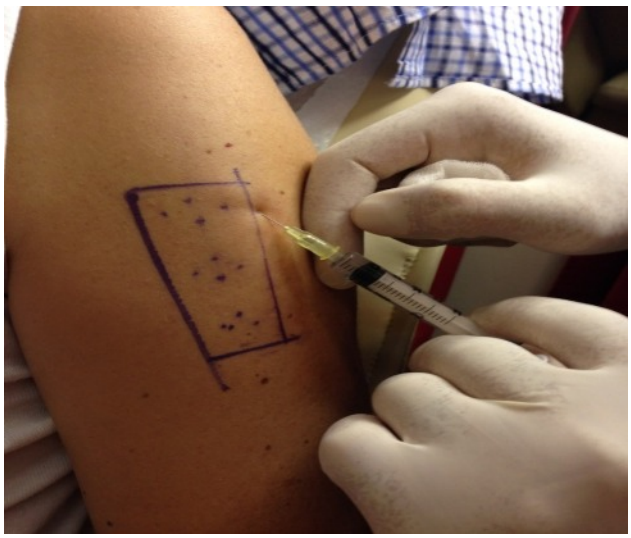

Photo 1.

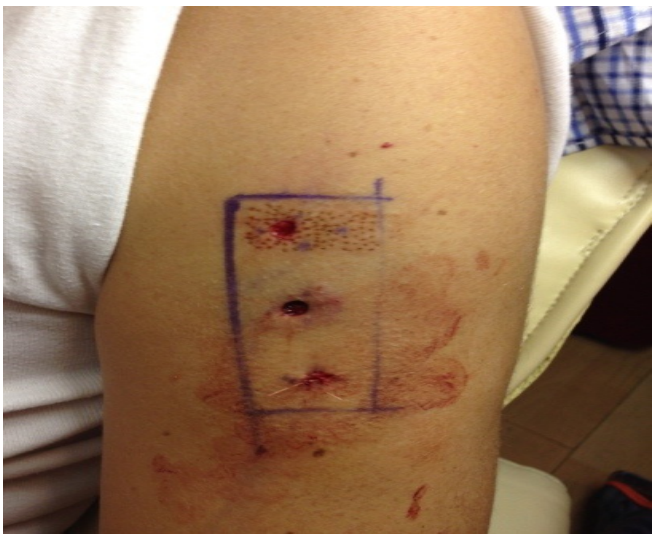

Photo 2.

We observe the stitches after five days and the withdrawal of crusts (photo 3). After 15 days while the stitches are not cut, the crusts have left (photo 4). At the point which was applied Plexr,we notice a pinkish color.

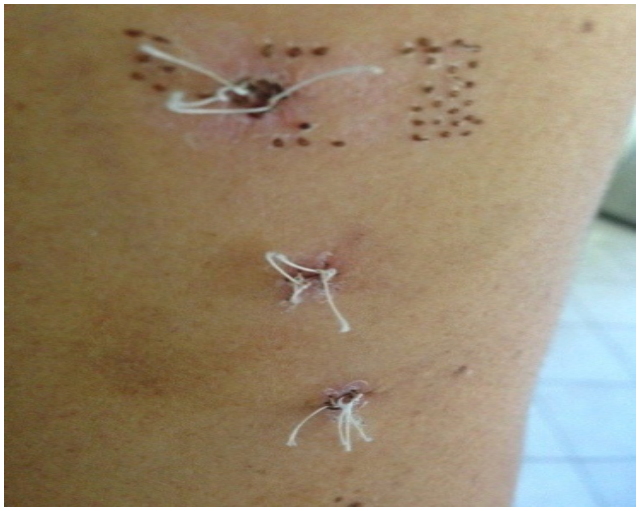

Photo 3.

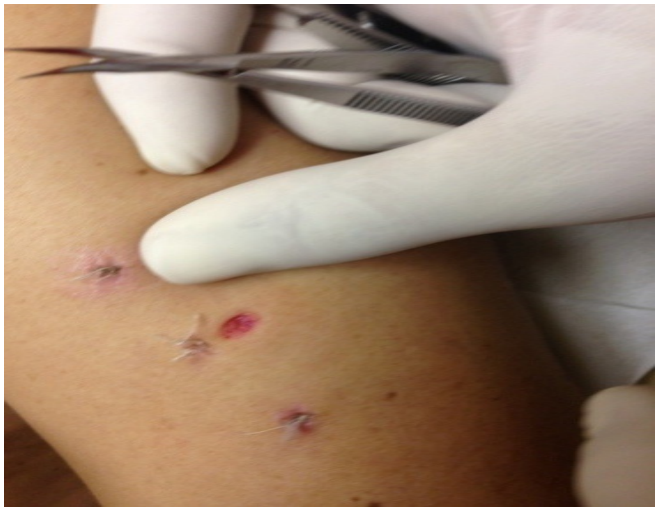

Photo 4.

3rd study:

Histology of PLEXR with (H-E)

Dr. Maria Sifaki (Dermatologist-Venereologist) applied Plexr (Photo 5, 6, & 7) at the painted area and then took biopsy from behind the ear area.

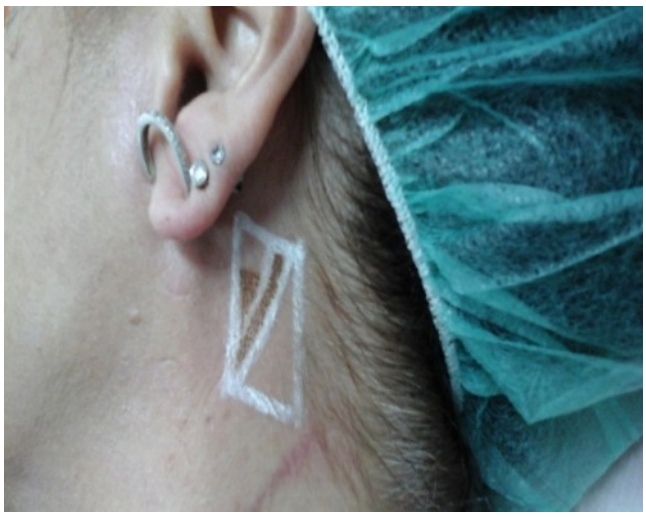

Photo 5.

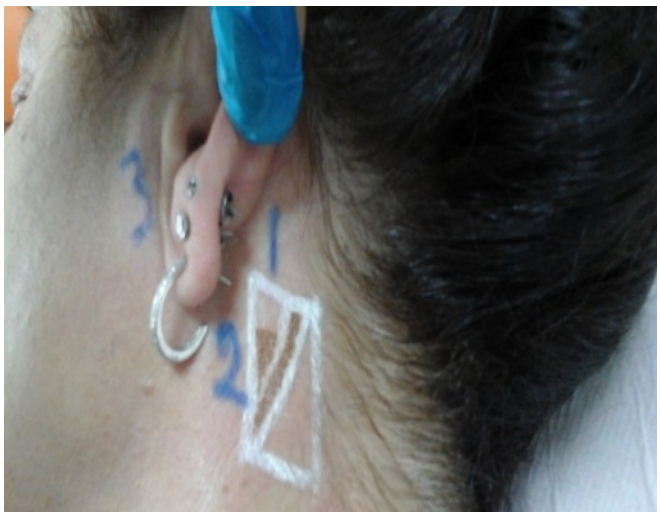

Photo 6.

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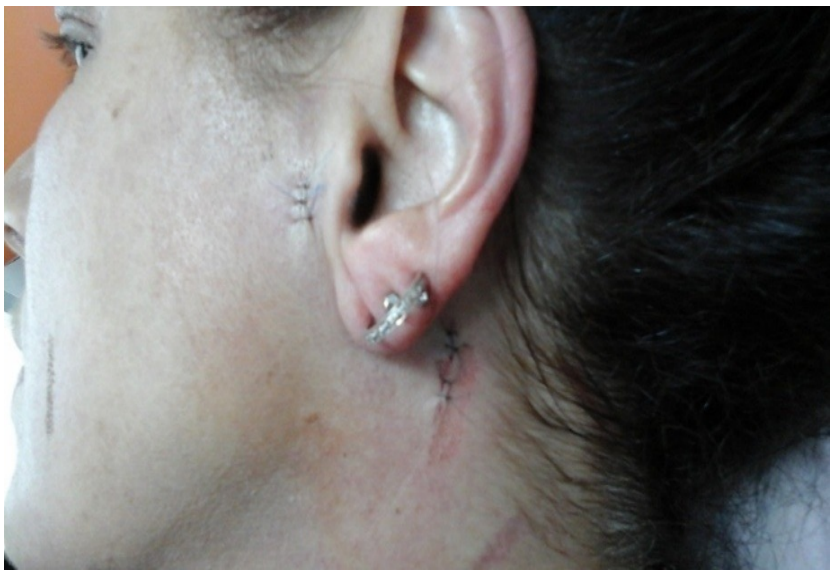

Photo 7.

Results/Findings

1st study:

The results showed that Plexr creates no lesions by heat in the skin, there is not also necrosis and presence of the inflammation. The conclusion is that the Plexr, as opposed to radio scalpel, avoid damage to the interior of parenchymal. (Figure 1).

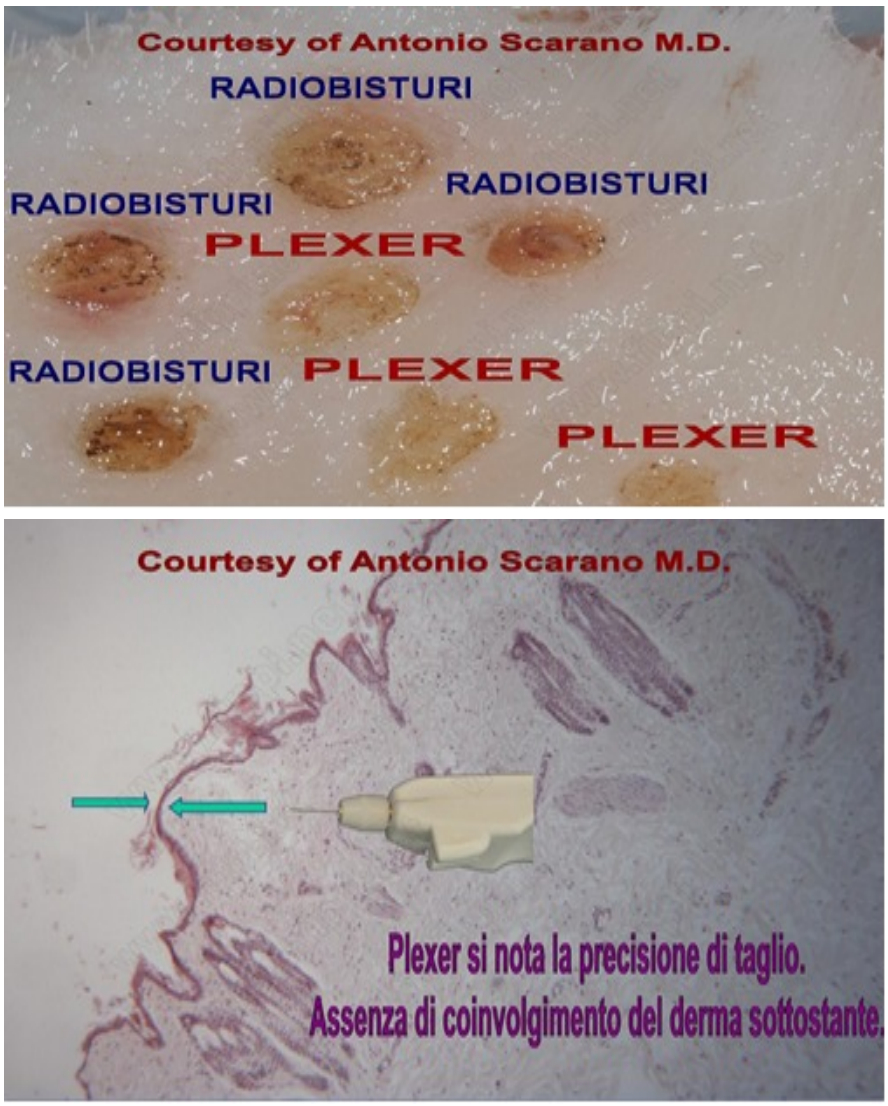

Fig. 1

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2nd study:

The results showed the below (Figure 2, 3, 4 & 5):

Normal skin: Elastic fibers stain x200.

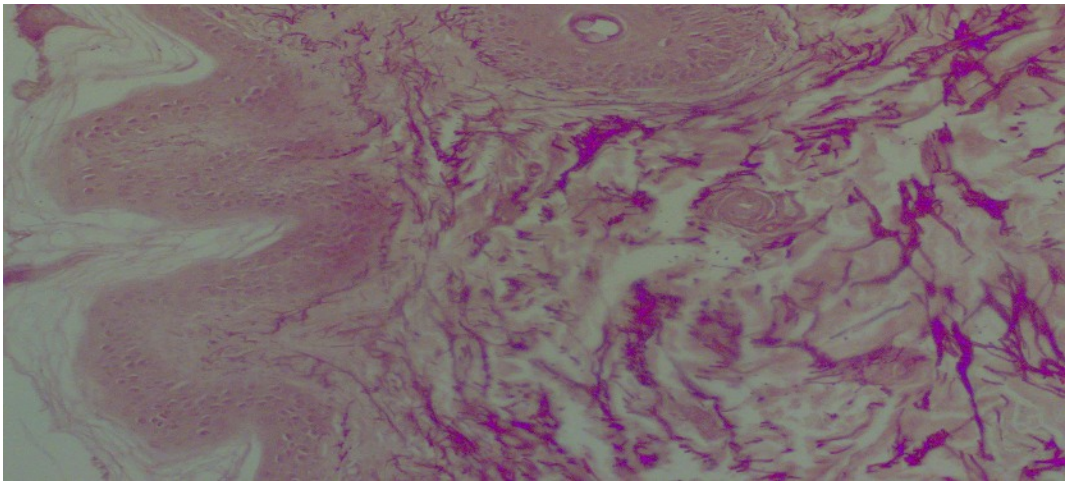

Fig. 2

It is the area in which the technique of Plexr was applied. In the left lower part is observed loss of the epidermis, but not the basal membrane and increased presence of fibrous tissue (acidophilia of the dermis due to heat, which produced protein denaturation), so injury is reversible. Respectively in the left upper part, skin is maintained (x200).

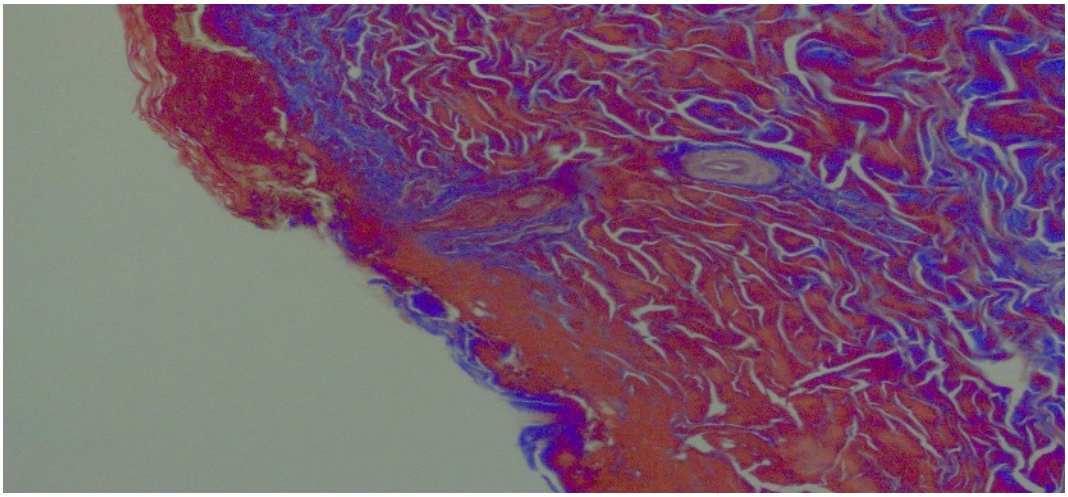

Fig. 3

The same area with blurring and shrinking of the elastic fibers x 200 D.

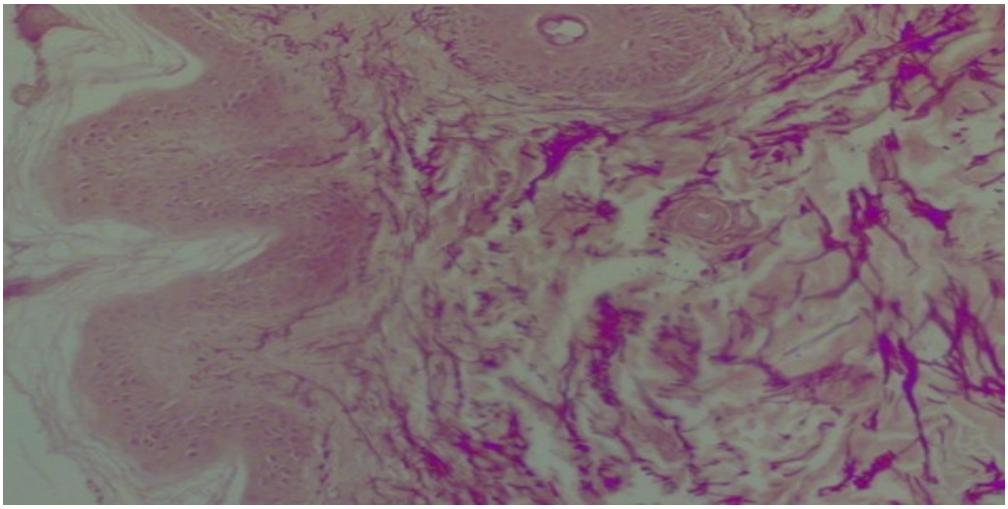

Fig. 4

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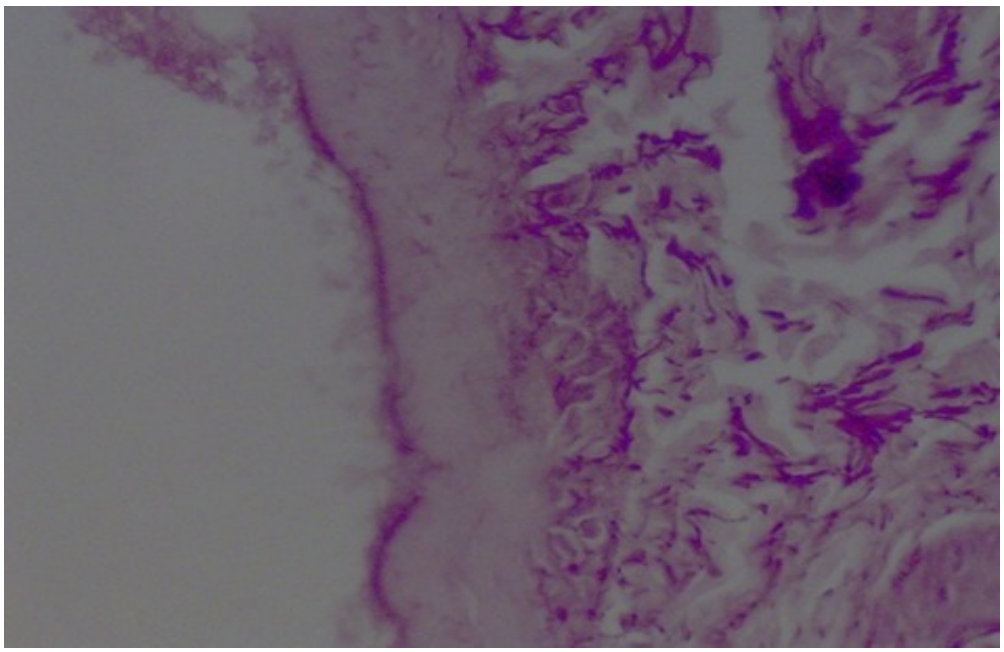

Fig. 5

As regards the image of skin lesions, thermal damage with Plexr at the 1st effect extended to a depth of 0.02 cm in the dermis (staining aimatoxylinis- eosin and Trichrome Masson), while the other method (radiobistury) extended at a thickness of 0.05 cm (i.e more than twice).

Also, at the same time healing, Plexr showed complete restoration of the epidermis and most limited thermal effect at a thickness of 0.01cm while the other method it was found that small ulcer stay with inflammatory and thermal effect to a depth of 0.04 cm.

3rd study:

1. Histology of PLEXR with (H-E)

⇨Normal skin before PLEXR application (Figure 6)

The thickness of dermis and underlying subcutaneous tissue was measured at 1635,579 μm (IMAGE ANALYSIS OLYMPUS).

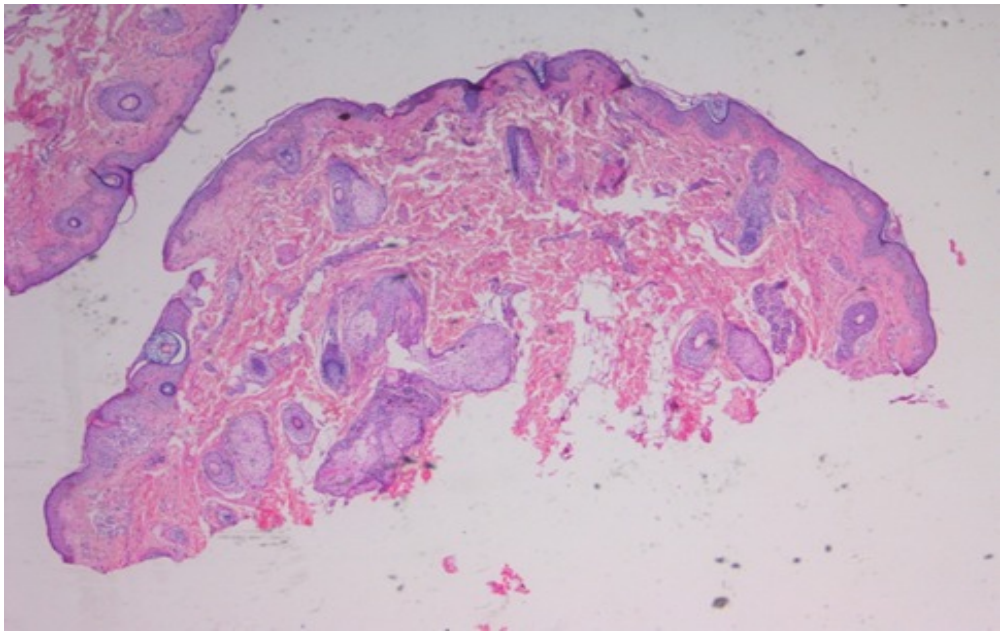

Fig. 6

⇨Skin immediately after PLEXR application

Loss of the epidermis with preservation of the basement membrane. In the underlying subepithelial dermis a band of homogenized collagen of considerable thickness is observed (Figure 7).

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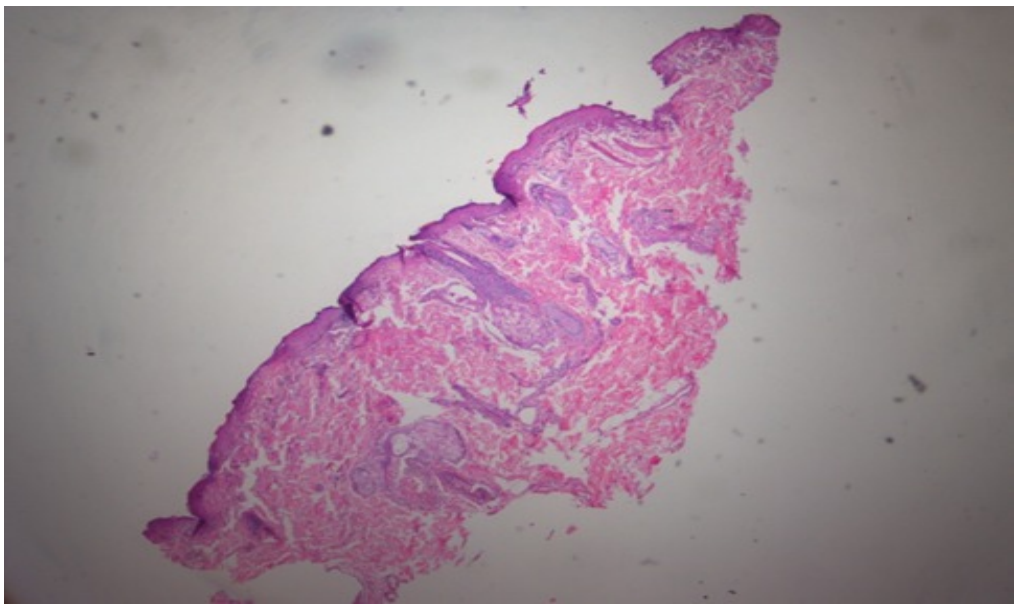

Fig. 7

⇨Skin (a week later)

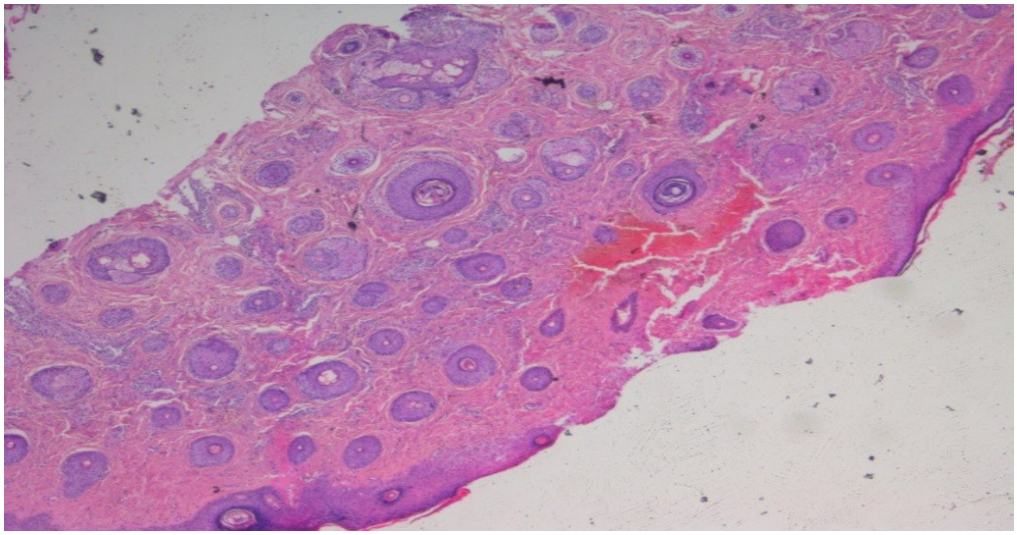

Fig. 8

Central gap with hemorrhage and adjacent areas of reepithelialization (Figure 8).

⇨Skin (a month later)

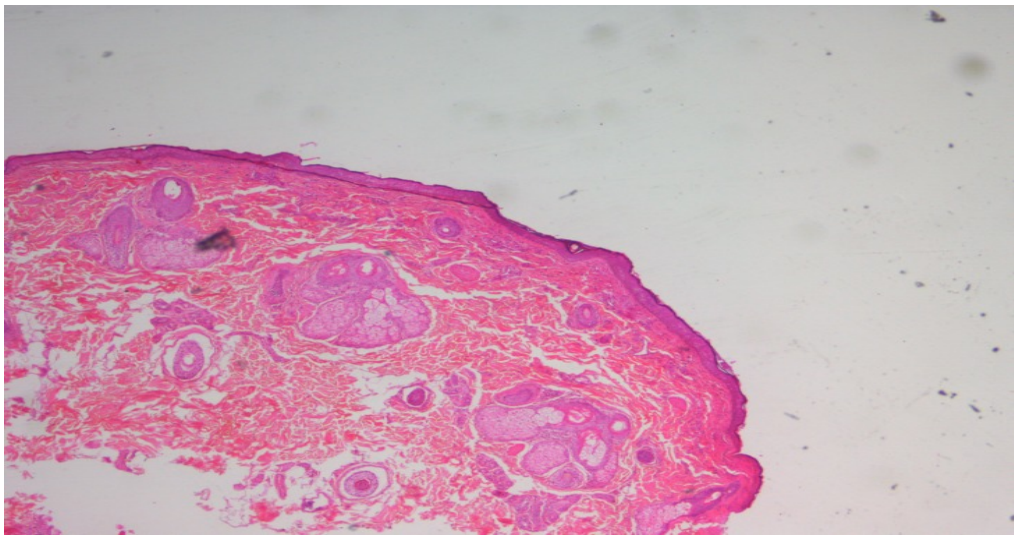

Fig. 9

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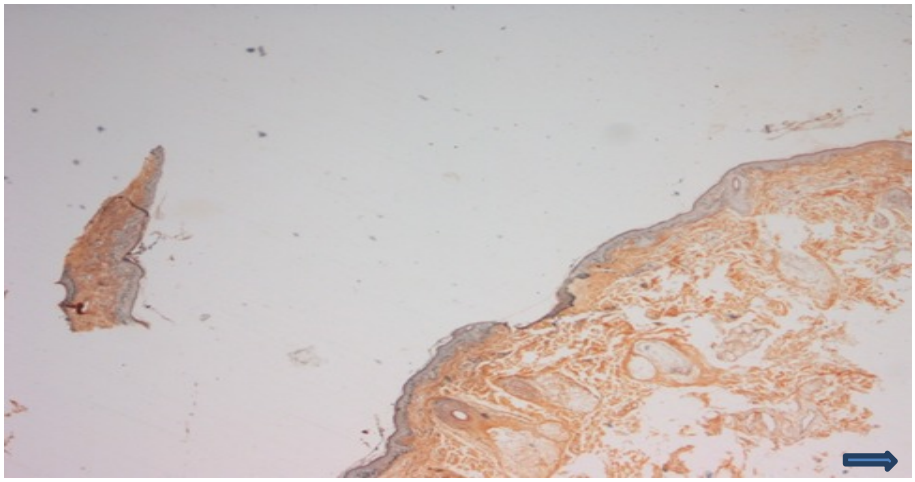
Results demonstrated that there is complete reepithelialization of the epidermis (Figure 9). Absence of subepithelial band of homogenized collagen and dermal thickness including underlying subcutaneous tissue is increased at 2316,518 μm (measured with IMAGE ANALYSIS OLYMPUS).

2. Reticulin stain

⇨**Skin (immediately after PLEXR application)** (Figure 10)



Normal Skin

Fig. 10

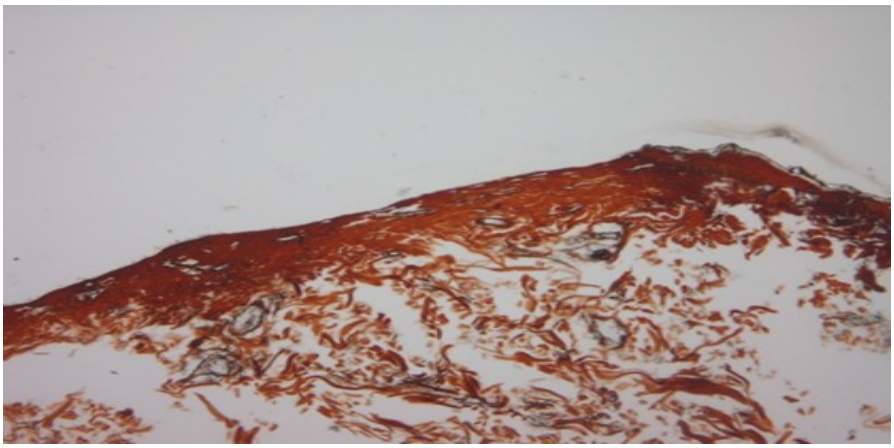


Fig. 11

Identification of homogenized collagen III underneath basal membrane by the use of reticulin (histochemical) stain (Figure 11).

(Reticulin stain is a histological staining method, used to visualize reticular fiber. Reticular fibers is a type of fiber in connective tissue, composed of type III collagen, secreted by reticular cells.)

⇨**Skin (a week, later)** (Figure 12 & 13)

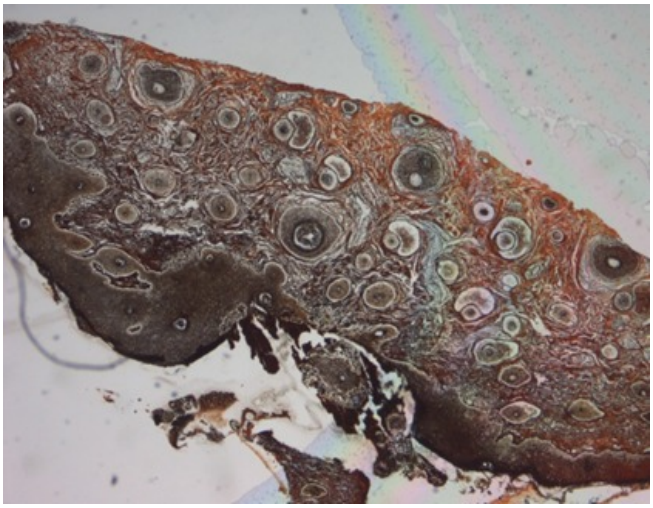


Fig. 12

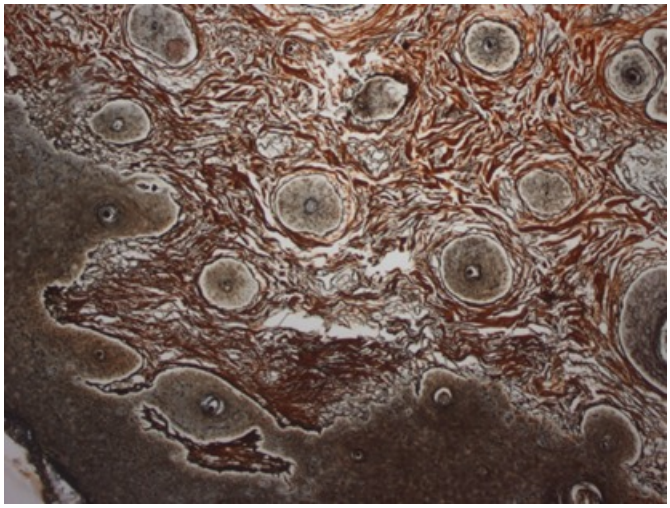


Fig. 13

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Results demonstrated that there is extensive replacement of the subepithelial homogenized collagen III layer by thick, organized fibers of collagen III.

⇨**Skin (a month later)** (Figure 14 & 15)

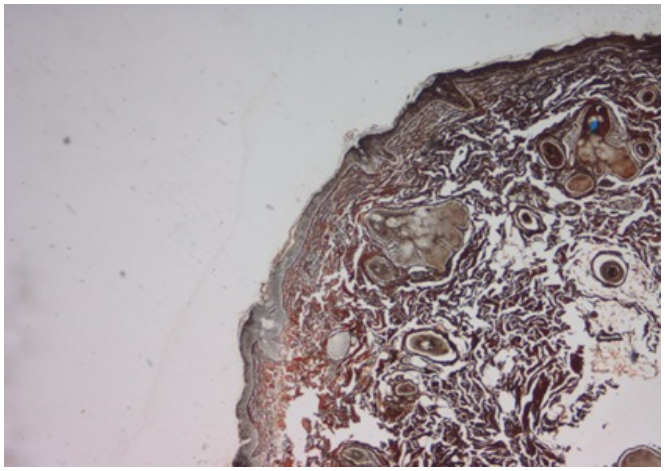

Fig. 14

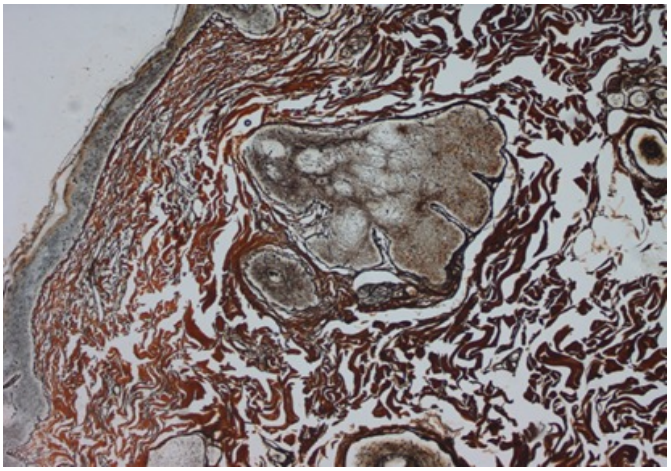

Fig. 15

Results demostrated that there is absence of subepithelial band of homogenized collagen and absence of subepithelial band of homogenized collagen.

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