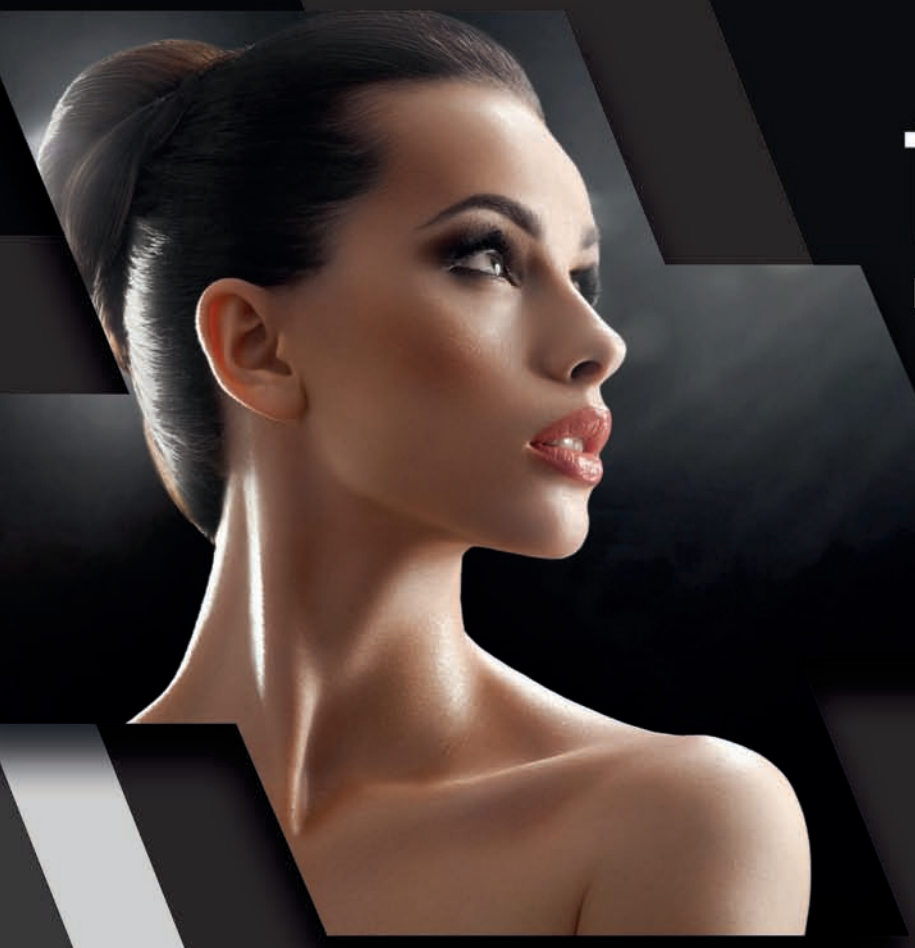

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NOWOCZESNY MEDYCZNY LASER ABLACYJNY CO_2

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Intuicyjny Interface

Finexel - nowoczesny, medyczny laser ablacyjny CO_2, którego wyjątkowe parametry pozwalają na głębszą penetrację skóry oraz skrócony okres gojenia. Laser może być stosowany w trybie chirurgicznym, w trybie frakcyjnym do zabiegów medycyny estetycznej oraz w trybie ginekologicznym.

Finexel posiada zaawansowane źródło laserowe, oferuje niezwykłą precyzję zabiegową, dzięki średnicy plamki 80µm oraz trybowi **UltraPulse** o wysokiej mocy szczytowej. Wyposażony jest w szybki skaner, oferujący największe pole zabiegowe, dostępne na polskim rynku, dla maksymalnego skrócenia czasu zabiegu. Posiada również przyjazne menu oferujące prostą i intuicyjną obsługę.

Wskazania zabiegowe:

- **Dermatologia:** Ablacja pieprzyków, włókniaków, brodawek, kępek żółtych, blizn przerostowych, syringomy.
- **Medycyna Estetyczna:** Resurfacing laserowy, odmładzanie, redukcja blizn potrądzikowych, rozstępów, blizn zanikowych, zmarszczek, delikatny peeling.
- **Ginekologia:** Leczenie objawów atrofii pochwy, objawów zespołu moczowo-płciowego, zespołu rozluźnienia pochwy, łagodnego wysiłkowego nietrzymania moczu.
- **Chirurgia:** Blefaroplastyka laserowa, labioplastyka, cięcie, koagulacja.

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Klinika Medical SPA by A. Surowiecka w Warszawie

Scar treatment - selected issues, part 1

A scar is a connective tissue formed in the healing process at the site of the traumatic action. Scars can be divided into mature and immature scars, and due to their shape into linear, atrophic, hypertrophic and keloids [1]. Another classification is to take into account the causative factor, and thus scars can be divided into postoperative, post-traumatic, including burns, and inflammatory scars [2]. Care for a burn wound and the prevention of contractures and burn scars are beyond the scope of this study.

The quality and appearance of the scar depend on many factors, including endogenous factors (e.g. cachexia, skin laxity, nicotinism) and exogenous factors (e.g. infections, localization, surgeon's skills). The treatment of the scar should begin at the stage of planning the surgical incision and selecting the suture material (primary prophylaxis). The use of the Langer line, ie the line of reduced tension, is a very important aspect of obtaining the best aesthetically pleasing scar [3]. Placing sutures in order to bring a wound closer, also a traumatic wound, should be performed without tension at the edges, which protects against ischemia. Proper nourishment of the patient before surgery, prevention of malnutrition during convalescence, quick improvement [4] and prophylaxis of surgical site infection are extremely important factors influencing the final appearance of the scar. Comprehensive scar treatment usually requires a combination of several methods (secondary prevention / treatment).

The selection of the appropriate technique should depend on the appearance and biology of the scar. The most commonly used methods of scar treatment are: laser treatments, microneedle radiofrequency, carboxytherapy, dermabrasion, microneedling, chemical peels, platelet-rich plasma and silicone-containing agents. Injections of glucocorticoids, cytostatic and immunomodulating drugs should be reserved for keloids and large hypertrophic scars. Very important, unfortunately often overlooked in the periprocedural period, is wound rehabilitation and early manual work with a scar. Surgical excision of the scar is the last resort with the risk of a larger and less aesthetic scar.

Manual scar therapy

Already in the early postoperative period, treatments are recommended to improve the outflow of lymph and reduce swelling of the surrounding tissues [6]. In the next stage, most often after the sutures have been removed and fully healed, it is advisable to work directly on the scar.

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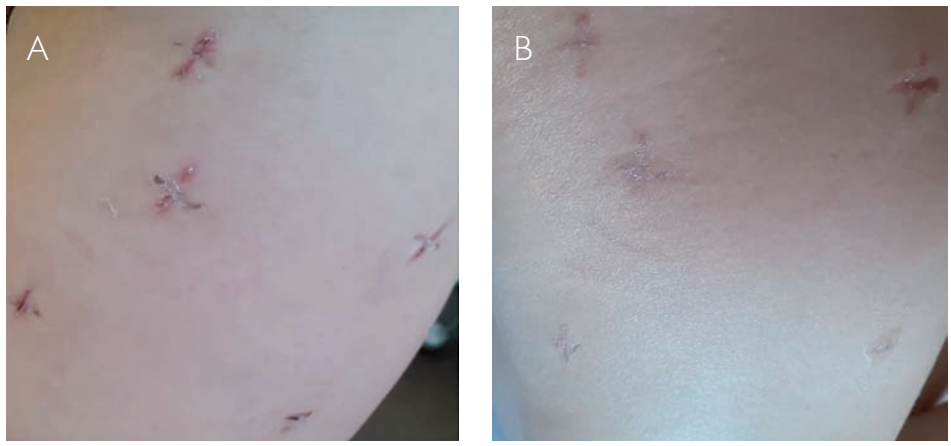
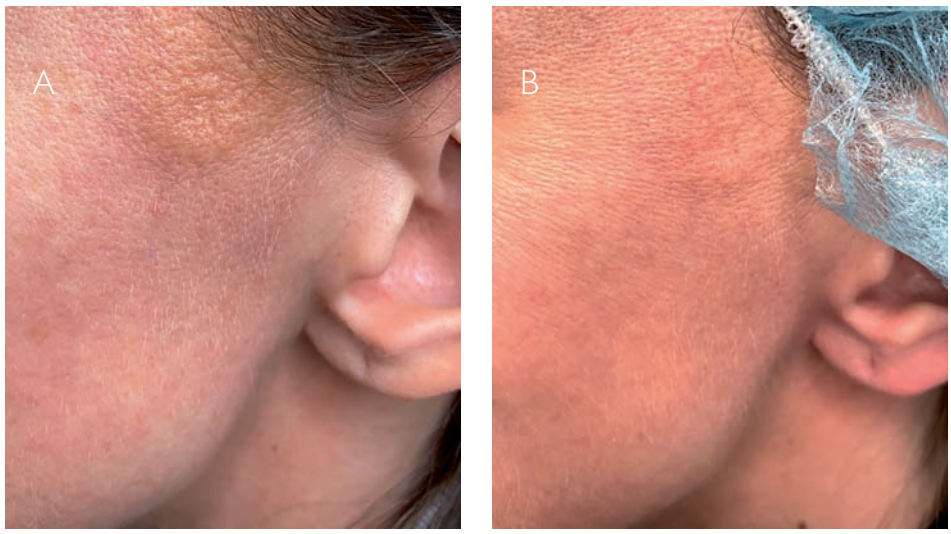


Figure 1] Lasers distribute energy, leaving numerous microscopic treatment zones (MTZ) on the skin, which initiate the process of tissue reconstruction and regeneration [15].

The force with which manual interventions are performed should be adapted to the quality of the tissues and changed as they are mobilized. It has been proven that the immobilization of scar tissue stimulates the formation of abnormal, crossed collagen fibers within it and is an additional factor in the formation of "folds" and progressive thickening of the scar. Manual therapy, including myofascial relaxation, reduces the inflammatory response within the scar and inhibits apoptosis. Moderate stretching and friction stimulate mechanoreceptors on the surface of the fibroblasts. Under the influence of the signal from the cytoskeleton, gene transcription is activated and extracellular matrix proteins and metalloproteinases are secreted, which condition tissue remodeling and proper arrangement of collagen fibers [7]. Tissue mobilization prevents the formation of adhesions with the surrounding tissues and the formation of contractures [6]. Moreover, scar rehabilitation significantly reduces pain and itching [8].

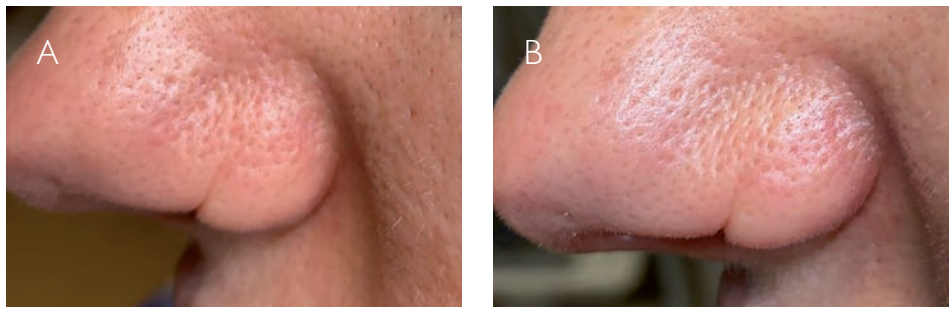
Laser therapy- LASH (eng. Laser Asisted Scar Healing)

Laser therapy (LASH) is recommended after the scar becomes mature, i.e. 2-3 months after its inception. Such a procedure protects against additional tissue damage and disruption of the natural healing processes [9]. However, there are individual reports of the beneficial effect of using the 595 nm or 810 nm light spectrum immediately after surgery. Light changes the architecture of the dermis and scars [10]. Laser therapy is usually used for hypertrophic scars. Pulse dye lasers (585-595 nm) [PDL, Pulsed dye laser], e.g. 595-nm PDL, Candela Laser Corp., Wayland, MA, distributed in Poland by Nova Group) induce photothermolysis through the hemoglobin chromophore and damage small blood vessels. The resulting areas of hypoxia as well as enzymatic degradation at the site of induced inflammation block the extracellular matrix hypertrophy and reduce the ratio of type 3 collagen to type 1 collagen. Additionally, they are devoid of ablative effect.



[Figure 2]. The use of a gel form of silicone in combination with chloric acid (I) and sodium chlorate (I) after CO2 laser therapy. The agent is used from 1 day after the procedure. Left (A) scar before treatment, right (B) 4 weeks after CO2 (constant use of silicone).

Diode lasers stimulate the secretion of collagen and thicken the dermis [9]. High energy CO2 ablation laser therapy (eg Finexel , SNJ, Korea, Nova Group distribution in Poland) can be used for hypertrophic scars and keloids [11]. The action of ablative fractional lasers is based on "evaporation" of water and heating of the dermis, which initiates autogenous tissue repair [9]. The dermis is rebuilt proper and stimulate fibroblasts. A well-organized network of collagen and elastin fibers is created in the dermis [11]. The ablation laser leads to the atrophy of the hypertrophic scar and to its softening. The ablative effect on the scar reduces the effects of the scar's astringent forces, which gives patients a relatively quick feeling of less tension in the scar and surrounding tissues. The process of heating tissues induces a molecular cascade, including the secretion of heat shock proteins (HSPs), metalloproteinases and the activation of pro-inflammatory pathways. This leads to the secretion of collagen types 1 and 3. Increased expression of the Wnt5a, CYR61 (responsible for neonagiogenesis) and HSP90 genes is achieved. Under the influence of the CO2 ablation laser, collagen fibers are thinner and reorganized to resemble normal skin [12]. After the therapy, reduction of itching and pain is observed [13,14]. CO2 laser therapy effectively improves the smoothness of the scar. The meta-analysis by Mahar et al. Assessed the effects of ablative laser therapy on the Vancouver Scoring Scale, which consists of 13 points and 4 subgroups (pigmentation, vascularity, softness / elasticity, height). The greatest changes were observed in terms of elasticity and then scar height [16]. Another study by Fallahi et al. Investigated the effect of a CO2 laser on the appearance of rhinoplasty scars. After 6 months, a significant improvement in the VSS scale was observed [17]. The CO2 laser penetrates the stratum corneum and



[Figure 3]. By using higher energies, 28-32 J / MTZ and small intervals between pulses, we can "cut" the scar. It is especially useful in convex fragments of the scar (effects after 1 treatment, 4 weeks after).

creates microscopic vertical channels that facilitate the penetration of drugs into the deeper layers of the skin [13, 14]. Therefore, recent observations have used combinations of laser therapy with topical medications to increase their penetration. The ablative laser can be used in combination with platelet-rich plasma or 5-fluorouracil [15]. Another option for associating the ablative method is with the PDL laser [18]. Treatment of hypertrophic scars is a major clinical challenge. It requires patience on the part of the patient and the doctor. When using lasers, remember that too high doses of energy may cause tissue burns and be counterproductive. A third-fourth degree burn should not be initiated, and the parameters should be selected so as to stimulate tissue remodeling and not damage it. In my practice, I sometimes encounter scars that have been deeply burned (4th degree burns). inject the platelet-rich plasma or the support-vascular fraction from adipose tissue, which will accelerate regeneration. However, this does not mean that you should burn the scar! You also need to remember about the interval between treatments. Tissues take time to remodel. Unfortunately, this means many meetings, at intervals of at least 21 days, and optimally 28 days. Both the patient and the doctor must be focused on a process whose framework cannot be clearly defined. Using the Finexel® laser, I start with the energy of 24 J / MTZ, observing the tissue reaction. In the absence of edema, I perform a second pass with increased energy of 28 J / MTZ. I adjust the treatment spot to the shape of the scar so that it has a minimal effect on the surrounding healthy tissues. As a consequence, their appearance became much worse than before the treatments! The only solution to increase the "strength" during the procedure is to

Figure 2 shows the effects of splenectomy hypertrophic scar. The central part of the scar lowered and softened significantly after the first treatment. In the case of raised edges on the border of healthy tissue and (atrophic) scar, I additionally cover a small fragment of healthy skin with the energy of 5-10 J / MTZ.

Finexel - is a modern medical ablation CO2 laser, the unique parameters of which allow for deeper penetration into the skin and a shorter healing period. The laser can be used in the surgical mode as well as in the fractional mode for aesthetic medicine procedures. The laser has an advanced laser source, offering remarkable treatment precision, thanks to the 80um spot diameter and the UltraPulse mode with high peak power. It is equipped with a fast scanner, offering the largest treatment area available on the Polish market, for the maximum reduction of treatment time. It has a friendly menu that offers simple and intuitive operation.

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Dr. Agnieszka Surowiecka, MD, a specialist in general surgery, holds a doctorate in plastic surgery. Trainer and lecturer. From July 2020, the international trainer of Croma Pharma GmbH. He conducts training for doctors in Poland and abroad in the field of lipotransfer techniques, autologous cell therapies (stem cells and platelet-rich plasma), fillers, biostimulators and hook threads. He is a frequent lecturer at international and national conferences. She is the founder of the Clinic of Aesthetic and Regenerative Medicine MedicalSpa by A. Surowiecka. In her daily practice, she focuses on stimulating regenerative processes and biostimulators.