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Review Article

A REVIEW ON TREATMENTS OF ATROPHIC ACNE SCARS

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ABSTRACT

Acne is a common chronic skin disease involving blockage or inflammation of pilosebaceous unit (hair follicles and their accompanying sebaceous gland) that can result in permanent scarring. Acne can cause atrophic scars that are a very unpleasant marker which have a negative psychological impact on social life. Acne scars can be divided into two categories: atrophic (depressed) and hypertrophic & keloid scars.Depending on the type and extent of scarring, a multimodal approach is generally necessary to provide satisfactory results. Therefore, many options are available for the treatment of acnescar. The aim of this review is the different therapeuticoptions for atrophic scars such asNon-Surgical Treatments,Skin resurfacing, Surgical Treatments and New approach.

Keywords: Atrophic acne scar; classification; non-surgical treatment, skin resurfacing, surgical treatments, new approaches.

INTRODUCTION

Acne: It is defined as a localized skin inflammation as a result of over activity of the oil glands at the base of specialized hair follicles[1]. Acne happens when oil (sebaceous) glands come to life around puberty, when these glands are stimulated by male hormones that are produced in the adrenal glands of both boys and girls[2]. The oil glands, which are located just beneath the skin, continuously produce and secrete oil through openings in the skin. The oil lubricates and protects the skin. Under certain circumstances, cells that are close to the openings of the oil glands block the openings. This causes a buildup of oil underneath the skin. Acne appears on the skin asoccluded pores ("comedones"), also known as blackheads or whiteheads, tender red bumps also known as pimples or zits,pustules (bumps containing pus), and occasionally ascysts (deep pimples, boils).Scar defined as the fibrous tissue that replaces normal tissue destroyed by injury or disease[3]. Atrophic acne scar: The medical definition of atrophic is “wasted away”. When an acne lesion forms, it is essentially a bundle of inflammation in the skin. This inflammation damages the part of your skin that gives it its firmness and elasticity and it hardens or “wastes away” in response. This produces a change in the texture of your skin that makes it look bumpy and uneven. This is what we call atrophic acne scarring[4].Acne is a common disease affecting almost 90-100% of youngsters[5]. Acne settles in the vast majority by 20 to 25 years of age but 1% of males and 5% of females exhibit acne lesions at 40 years of age[6].(5) Scarring occurs early in the course of acne and may affect to some degree 95% of patients from both sexes[7].Differences in the cell-mediated immune response are involved in the personal tendency to develop post acne scarring. Acne scars are debilitating and socially disabling for the individual[8].

CLASSIFICATION

Classification frequently used in clinical practice for acne scars are A. Based on both clinical and histological features[9, 10]and B.Goodman’s qualitative global scarring grading system[11].

Based on both clinical and histological features:

Those involving tissue loss (Atrophic scars): Atrophic scars are broad, shallow, saucer-like indentations that result from loss of collagen deposition during the wound-healing process of acne lesions. They are more common than hypertrophic scars and keloids.

Superficial macular scars: These scars may appear as macules that may be discolored, either erythematous if inflamed and comparatively early or young scars (under 1 year) or with altered pigmentation. Coloring or pigmentation of scars may be increased in patients with olive-colored skin and represents mostly a postinflammatory response that will fade in 3–18 months. This requires sun protection. Reparative treatment may not always be required.

Deep dermal scarring: Includes a). Icepick scars, b). Rolling scars and c). Boxcar scars. Ice-pick scars are frequently deeper, with sharp, steep sides. Rolling scars are caused by damage under the surface of the skin. They give the skin a wave-like appearance. They tend to be wide and shallow. Boxcar scars are angular scars with sharp vertical edges and are often found on cheeks and temples. They may be shallow or deep.

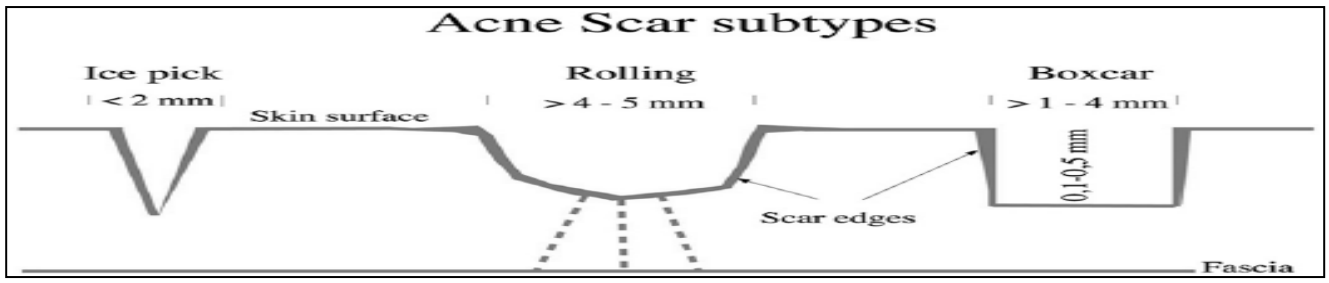

Figure 1: Subtypes of acne scar[10]

Those involving tissue excess:

Hypertrophic scars: Confined to the boundary of the original injury and increase in bulk by pushing out the margin. They are usually asymptomatic and develop within weeks after the injury and tend to resolve gradually. They tend to appear on the upper back, upper chest and deltoid region but can also appear on mandibular, malar and glabellar regions.

Keloids: They are irregularly shaped scars that extend beyond the borders of the original wound into adjacent tissue. They are often pruritic and tender. They are common in mandibular arch, shoulders and sternal region and are prone to recur.

Bridge: Bridge is a brous string over healthy skin. They are common on face.

Popular scars: They are soft elevations and are frequently observed on the trunk and mental area.

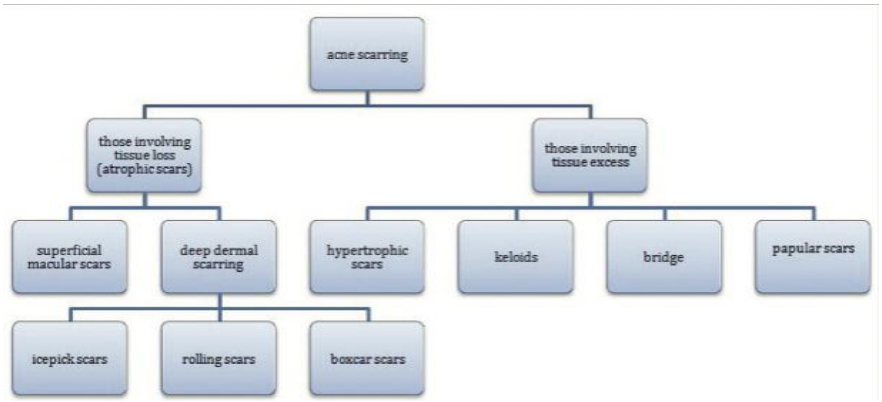

Figure 2: Classification of acne scar.[9, 10]

Scaring type	**Number of lesions 1(1-10)**	**Number of lesions 2(11-20)**	**Number of lesions 3(>20)**	**Examples**
[A]Milder (1 each point)	1 point	2 point	3 point	-macular erythematous/pigmentedmildly atropic dish -like
[B]Moderate (2pointeach)	2	4	6	Moderately atropic dish like, Punched out with swallow bases small scar <5 mm Swallow but broad atropic areas
[C]Severe 3 points	3	6	9	Punched out with deep but normal bases <5mm, Punched out with deep abnormal bases <5mm linear /troughed dermal scarring, deep broad atropic areas
[D]Hyperplastic papular scars	2	4	6	
[E] Hyperplastic keloid ,hypertropic scars	Area< 5 cm2 (6 points)	Area5-20 cm2 12 points	Area >20cm2 18 points	

Table 1: B. Gooddman's qualitative global scarring grading system 5 uses a four-scale grading system[11]

TREATMENT

Treatment of acne scars presents a challenge for a physician. Usually they cannot be effectively corrected by a single treatment modality because of their widely varied depth, width, and structure. There are different types of treatment available to reduce the acne scars. Treatment of acne scar is based on different types of scars. The main factors that influence scar formation are genetic and capacity to respond to trauma. Thevast majority of information on the treatment of acne scarring relates to the use of physical modalities

and surgical procedures, such as dermal injection, laser therapy, microdermabrasion&dermabrasion, skin needling, punch excision technique, subcision, radiofrequency, fat transplantation and stem cell therapy.

NON-SURGICAL TREATMENTS

Dermal Injections/Facial Fillers:

Injectable fillers can be used to augment soft tissue, particularly in soft atrophic rolling or boxcar scars. Modes of injection include serial punctures, linear threading, fanning and cross-hatching, deep bolus, and superficial micro- droplet injections[12]. The common adverse effects include infection, pain, erythema, lumps, swelling, and abscess formation. Fillers can be classified as temporary, semi-permanent, and permanent[13].Soft tissue fillers may be used for treatment of atrophic scars to fill pitted or depressed areas on the skin. The results are temporary and additional treatments are necessary. Temporary fillers typically last for a few months and repeated treatments are necessary. Example is the injection of hyaluronic acid fillers (HaF) which stimulates collagen production by fibroblasts, augmenting soft tissue and improving the quality of the overlying skin[14].Semi-permanent fillers can last up to two years and stimulates fibrous tissue formation. Benefits of these long-term fillers such as (Calcium hydroxylapatite and injectable poly-L lactic acid [PLLA]) are two longer-acting products that have published information on their use for atrophic acne scarringinclude minimal reaction or infection risk as they become a permanent part of the skin. Two recent case reports have further supported the clinical benefits associated with injectable PLLA for the treatment of atrophic acne scars [15, 16]. Calcium hydroxylapatite wasevaluated in a single-center, prospective, controlled trial of ten patients with acne scarring (including at least one saucerized scar)[17]. At the 12-month evaluation, three patients showed >75% improvement and six patients experienced 50–75% improvement in treated saucerized scars; one patient had 25–50% improvement in this type of scar.Permanent fillers comprise larger particles that cannot be phagocytosed. they can last several years to lifelong. Polymethylmethacrylate (pmma) is a synthetic permanent filler suspended in bovine collagen and lidocaine[18]. Bellafill which is a polymethylmethacrylate (pmma), the first FDA-approved medical device for the correction of acne scars, is indicated for moderate-to-severe atrophic, distensible acne scars on the cheeks in adults. The safety and efficacy of bellafill in acne scars is being further evaluated as a monotherapy (clinicaltrials.gov, nct02642627)[19].

SKIN RESURFACING

Laser Therapy:

The options for laser treatment of acne scarring have advanced tremendously in the recent years and have gained in popularity given their impressive results. It is an effective treatment that is easier to use than

other modalities[20].Different types of laser, including nonablative and ablative lasers, are very useful in treating acne scars, except for deep ice pick scars[21]. The mechanism of ablative lasers is by removal of the damaged scar tissue through melting, evaporation, or vaporization. Carbon dioxide laser and Erbium YAG laser are the most commonly used ablative lasers for the treatment of acne scars. These abrade the surface and also help tighten the collagen fibers beneath. Nonablative lasers do not remove the tissue, but stimulate new collagen formation and cause tightening of the skin resulting in the scar being raised to the surface. Among the nonablative lasers the most commonly used are the NdYAG and Diode lasers [22]

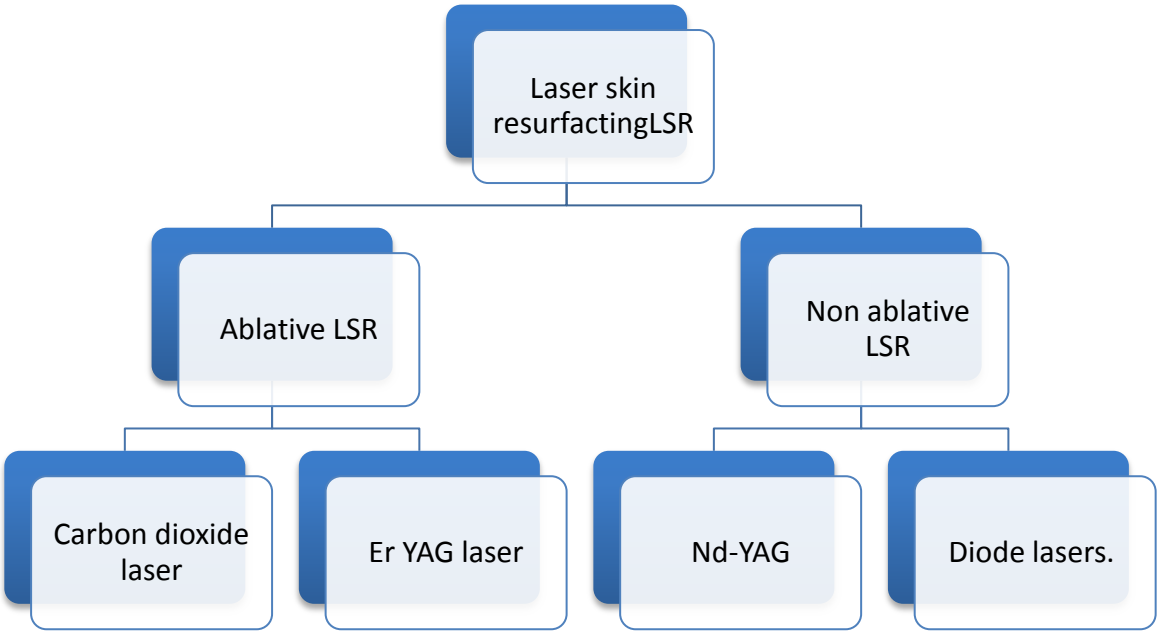

Figure 3: Classification of laser therapy[22]

Ablative lasers- Carbon dioxide laser and Erbium laser are most commonly used lasers. A)Carbon dioxide (CO_2) laser: CO_2 laser resurfacing vaporizes tissue at a depth of 20 to 60μm and zones of thermal necrosis ranging another 20 to 50μm[23].Energy at 10.600nm wavelength is absorbed by both intracellular and extracellular water, causing rapid heating and vaporization of tissue[24].Dermal heating below the zone of ablation induces a wound-healing response,which causes collagen remodeling and heat-mediated tissue contraction. Re-epithelialization generally takes 5 to 10 days, and erythema may persist for months[25].Side effects may include dyschromia (hyper- or hypopigmentation)[17]infection,lines of demarcation between treated and untreated areas,and scarring[26].B)Erbium: yttrium-aluminum-garnet (Er:YAG). Er:YAG emits a wavelength of 2940nm[27]is 10 times more selective for water than CO_2 laser due to its shorter wavelength, and reduces residual thermal damage[28].Er:YAG at 5J/cm vaporizes tissue at a depth of 20 to 25μm with an additional 5 to 10μm zone of thermal necrosis.The main difference is that energy from the Er:YAG laser more

closely approximates the absorption peak of water (3,000nm), so virtually all the energy is absorbed in the epidermis and superficial papillary dermis. Thus, it has a more superficial ablation profile and a smaller zone of thermal damage beneath the ablated layer[28]leading to shorter healing times and a lower rate of side effects and epithelialization takes 4 to 7 days with Er:YAG. Hu et al. [29] reported that patients suffering from severe atrophic acne scarring, had a 72.7% satisfaction rate, with acceptable downtime in one treatment session using the ablative fractional Er:YAG laser in one clinical study.

Non-ablative lasers-Non-ablative is popular nowadays for treatment of acne scar due to decrease in side effects and need for postoperative care. Most commonly used non-ablative lasers are Nd:YAG and Diode lasers. A)The Nd:YAG laser is used on patients with darker or more sensitive skin. These lasers cool the surface of the epithelium while also penetrating the deeper layers of the skin with infrared wavelengths, these wavelengths targets underlying water and collagen without disrupting the epidermal layer [30]. The Nd:YAG laser requires more sessions (3–5 treatments per month for several months), but a patient can expect to see a 40- to 50-percent improvement in the quality of their scarring[31]. The results are long lasting and continue well beyond the last treatment, indicating ongoing collagen remodeling after completion of the laser treatment sessions[32]. B)The diode laser, in the infrared spectrum targets the water in the upper dermis, remodels the skin's underlying collagen, and promotes formation of new collagen[33], which increases in collagen synthesis and deposition was noted after six months of treatment with this laser. Side effects are minimal and are postoperative erythema, edema, and hyperpigmentation[33].

From non-ablative lasers, improvements were seen on the acne scar but it was not as impressive as from other lasers. Comparison of a 1450-nmdiode laser and a 1320-nm Nd:YAG laser in the treatment of atrophic facial scars, a new concept in skin laserhas been designed, whichis called fractional photothermolysis[10]. Fractional photothermolysis selectively damages the dermal tissue to induce a wound-healing response that affects the stimulation of prolonged neocollagenesis without damage to the epidermis inorder to overcome the problems associated with laser resurfacing, dermabrasion, and chemical peeling[34], effectiveness of treatment was noted, ranging from icepick to boxcar and rolling scars[35]. The side effects of this system are less and compared to the conventional ablative laser and an increased efficacy of tissue regeneration compared to the ablative methods[36].Pinpoint irradiation technique is as effective as fractional photothermolysis in the treatment of atrophic scars[37]. It induces microscopic thermal wounds to achieve skin rejuvenation treatment for icepick acne scar. Complications are also rarely seen in this technology[37].

Emerging laser technologies:

Picosecond 755nm Alexandrite laser compared to the traditional nanosecond lasers, picosecond lasers deliver shorter pulse durations with lower influences of energy, and therefore may lead to fewer adverse effect[22].The picosecond 755nm alexandrite laser picosure received FDA approval to treat tattoos

and pigmented lesions in 2014. It has also been evaluated for the treatment of acne scars and, with the aid of a diffractive lens array, which delivers pulses 500μm apart, permitting treatment of a greater surface area and pattern density per pulse. the picosure has been shown to improve the appearance and texture of atrophic rolling scars similar to fractional ablative lasers[35].

Microdermabrasion/Dermabrasion:

Microdermabrasion and dermabrasion are facial resurfacing techniques that mechanically ablate damaged skin in order to promote re-epithelialization. Dermabrasion is an old technique that uses motorized device equipped with an abrasive material to removes the epidermis and penetrates to the level of the papillary or reticular dermis, inducing remodeling of the skin structural proteins [38] they are particularly effective in the treatment of scars and can perform clinical significant improvement in skin appearance [39]. Microdermabrasion removes the outer layer of the epidermis, accelerating the natural process of exfoliation[40]. Dermabrasion, with respect to microdermabrasion, completely removes the epidermis and exposes the papillary or reticular dermis, inducing remodeling of the skin's structural protein[41]. Microdermabrasion is usually painless, it does not require anesthesia and multiple sessions are frequently required. A variety of microdermabraders are available. All microdermabraders include a pump that generates a stream of aluminum oxide crystals with a hand piece and vacuum[42]. Occasionally, sodium chloride, sodium bicarbonate, or magnesium oxide crystals are used. Although they are cheaper, these crystal alternatives are not as abrasive and are less efficacious then aluminum oxide crystals [43]. In comparison to dermabrasion, microdermabrasion has a lower efficacy and it shouldn't be used to treat deep scars but it is associated with a low risk of side effects. They usually include temporary stripping of the treatment area, bruising, burning or stinging sensation, photosensitivity, and occasional pain. Dermabrasion is performed under local or general anesthesia. It usually uses highspeed brush, diamond cylinder, fraise, or manual silicon carbide sandpaper[44]. Side effects are frequent and include prolonged erythema, bacterial or viral infection, hypertrophic or keloidal scarring, sun-sensitivity, transitory or permanent hypopigmentation or hyperpigmentation, especially in dark skin patients[45]. It is not useful in the treatment of ice pick or deep boxcar scars[45].Hand sanding[46]. A newer form of dermabrasion that is recommended for some patients. This technique uses no electrical instruments, nor any freezing sprays decreasing the risk of pigment loss or a permanent change in pigmentation as previous dermabrasion techniques. This is also safe for patients of color; patients with different levels of pigment in their skin. While not only effective, this hand sanding technique is safe and can be repeated even for patients with the worst acne and the darkest skin.

Chemical Peeling:

Chemical peelings are a procedure used for cosmetic improvement of the skin or for treatment of some skin disorders. Popularity of chemical peels is related to their versatility and relative simplicity. During

the peeling procedure, chemical exfoliating agent is applied to the skin to destruct portions of epidermis and/or dermis with subsequent regeneration and rejuvenation of the tissues. The peels are classified as superficial, medium, and deep according to the depth of penetrationof the peeling solution [47] is shown in table 2 [48]. The depth of the peel determines patient's inconvenience during and after the procedure, healing time, the rate of the potential side effects, and the results.Dyschromias,skin ageing, wrinkles and acne scars are indication for chemical peeling[49]. The complications of chemical peels includes pigmentary changes, infections, milia, acneform eruption, scarring, and cardiotoxicity. It is not effective in ice pick and rolling scar but the patient with boxcar, application of trichloroacetic acid improvement from 50%-90%in single scar [10].Different type of chemical agent used are shown in table 3.

Depth of penetration	**Histologic level**	**Peeling agents**
Very superficial	Destruction of the stratum corneum without creating a wound below the stratum granulosum	• GA, 30–50%, applied briefly (1–2 min) • Jessner's solution, applied in 1 to 3 coats TCA 10%, applied in 1 coat
Superficial	Destruction of part or all of the epidermis, anywhere from the stratum granulosum to the basal cell layer	• GA, 50–70%, applied for a variable time (2–20 min) • Jessner's solution, applied in 4 to 10 coats • TCA, 10–30%
Medium depth	Destruction of the epidermis and part or all of the papillary dermis	• GA 70%, applied for a variable time (3–30 min) • TCA, 35–50% Augmented TCA (CO2 plus TCA 35%; Jessner's solution plus TCA 35%; GA 70% plus TCA 35%)
Deep	Destruction of the epidermis and papillary dermis, extending into the reticular dermis	• Phenol 88% • Baker-Gordon phenol formula

Table 2: Classification of peeling agents according to penetration[48, 50].

Abbreviation: GA: Glycolic acid; TCA: trichloroacetic acid.

Chemical agent	Penetration	Concentration and composition	Indication	Side effecct
1.Trichloroacetic acid[51]	Superficial/medium	-Superficial:10-25 % -Medium:30-50% -Monheit's combination: jessner's +TCA 35% -Coleman's combination:70%GA +TCA 35% -Brodys combination: solid CO2 + TCA 35%	Acne scar,AKs,fine lines/wrinkles,lentigines photoageing	stinging and burning sensation,high concentrations not recommended in skin types V to VI, and potential for hypo/hyperpigmentation [15].
2.Glycolic acid/salicylic acid [10, 52]	Superficial	Concentration varies upon the desired effect:GA 20-70%,SA 20-30%	Acne, fine lines/ wrinkles, photoageing	erythema, dryness
3.Resorcinol [53]	Superficial	40-50%,Benzenediols	Acne, fine lines/ wrinkles, photoageing,melasma	Erythema,excessive desquamation
4.jessners's solution[54]	superficial/medium with TCA	Resorcinol, salicylic acid ,lactic acid 85%,ethanol 95%	Acne scar,AKs,fine lines/wrinkles,lentigines photoageing,PIH	Minimal erythema.
5.phenol[52]	deep	Baker Gordon formula:phenol88% ,tap water,liquid soap,croton oil	Deep acne scaring	cardiac arrthymia, cardiactoxicity

Table 3: Different type of chemical agent used*:*

Abbreviation: GA: Glycolic acid; SA: salicylic acid; PIH: post inflammatory hyperpigmentation; TCA: trichloroacetic acid; CO2: carbon dioxide; AK: Actinic keratosis.

Skin Needling:

Skin needling, also referred to as collagen induction therapy(CIT)or percutaneous collagen induction[55].Itis a minimally invasive procedure that uses fine needles to puncture the epidermis. The microwounds created stimulate the release of growth factors and induce collagen production[56].Traditionally, a small roller equipped with rows of small needles typically ranging in size from 0.5 to 3.0 mm in length is passed over the skin using gentle pressure, puncturing the superficial layers of the skin to loosen fibrotic adhesions and induce collagen synthesis. This procedure may be repeated several times within a single session or over multiple sessions depending on the depth and quality of the scars. This technique has been reported to reduce scar depth up to 25% after 2 sessions[57]Microneedling represents a safe, cost-effective, and efficacious treatment option.

SURGICAL TREATMENT

Punch Excision Techniques:

In punch excision, a scar is removed with a punch biopsy tool and the site is sutured or allowed to heal by secondary intention. Punch excision is mainly indicating for ice-pick or boxcar scars[58]. Punch techniques are reported to be efficacious for the treatment of ice pick scars but risk includes graft failure, graft depression and formation of sinus tract [59]. According to diameter, depth and shape of scar, a biopsy punch of appropriate size is used to excise the scar and, then, closure or elevation or grafting is possible options to perform.

Punch excision and closure: Scar is excised and sutured after undermining, in a parallel direction to the relaxed skin tension lines. The goal is to trade a larger, deeper scar for a smaller, linear closure that will hopefully be less noticeable.

Punch incision and elevation: If the depressed scar has a normal surface texture, it is incised up to the subcutaneous tissue and its base is elevated and, then, sutured to the level of the surrounding skin.

Punch excision and grafting: Scar is excised and replaced with an autologous, full-thickness punch graft. The post auricular region or the buttock are the most used donor sites[60].

Subcision:

Subcision is a more physically intensive technique useful for treatment of superficial atrophic acne scars. It is best suited for rolling acne scarsand has a success rate of 50% to 60% in the treatment of rolling scars, with less efficacy for icepick and boxcar scars[61] This method involves the use of a small needle that is inserted into the periphery of a scar before being moved in a back-and-forth manner underneath the base of the scar to loosen the fibrotic adhesions that result in the depressed appearance of the scar[62]. Additionally, loosening of the tissue and resultant bleeding creates a potential space for future collagen deposition during the subsequent wound-healing phase. The advantages of this innovative method include the following: easy to apply, inexpensive, short down-time, applicable for various skin types,no significant complications, and remarkable and persistent improvement in short time without injury to the skin surface[63]. The adverse effects are pain at the time of subcision in some cases, bruising, transient discoloration, hemorrhagic papule and pustule, hypertrophic scar, necessity of frequent suctioning sessions, and recurrence[64].

NEW APPROACH

Radiofrequency:

It is a nonionizing electromagnetic radiation with frequency ranging from 3-300GHz. RF creates an electric current in the dermis at preset depths to induce thermal damage and eventually collagen synthesis. It has been reported that 25-75% improvement in scar after several treatments[65]. Fractional bipolar RF is based on 'sub-lative rejuvenation' principle, which causes low epidermal disruption with high dermal remodeling and improves the efficacy and can reduce side effects of fractional photothermolysis[66]. In a study it is reported that these radiofrequency have better improvement in ice pick scars than other superficial scars[67]. Plasma resurfacing is a new method that utilizes non-laser device to generate plasma, a cloud of neutrons, from nitrogen atoms and spark of radiofrequency, including the plasma radio frequency, RF dot matrix, gold micro needle RF. Disadvantages are rare and include temporary hyperpigmentation, erythema, edema, epidermal de-epithelialization, infection, and scarring[65]. A number of modalities have been used to treat acne scars, from invasive surgeries to nonablative RF treatments. Nonablative RF treatments have undergone an evolution from simple unipolar devices to the most recent fractional bipolar microneedle RF modalities which has offered more precision to deliver RF energy to deeper tissues with decreased injury to the overlying epidermis, and has allowed for the treatment.From studies, thus far with RF it appears that bipolar fractional microneedle and fractional bipolar RF have shown the best results for resolution of acne scars[68]. It takes an average of three to four treatment sessions with one to two passes and 3 months posttreatment for these results to be fully appreciated. This is most likely due to the required time for adequate activation of fibroblasts and the upregulation of the collagen production needed to replace the dermal matrix. Side effects include transient pain, erythema, and scabbing that resolve within 3–5 days;

albeit, the pain is significantly less with RF compared to fractional laser treatment[66].Besides improvement in acne scars, patients may see additional beneficial aesthetic improvements in skin texture, skin tightening, fine lines, and wrinkles, and a reduction in noticeable pore size.

Fat Transplantation (Ft):

It is cheap, readily available, and incapable of being rejected or causing allergic or other adverse tissue reactions. Itconsists of two phases[69]: procurement of the graft and placement of the graft. The injection phase with small parcels of fat implanted in multiple tunnels allows the fat graft maximal access to its available blood supply. Autologous fat transplantation may be suitable for the treatment of severely depressed scars or scars with abnormal contours in which there is a loss of subcutaneous fat[70]. Most acne-scarred patients achieve maximum results about three months after the procedure[11].

Stem Cell Therapy:

Stem cell therapy is a new emerging technology, which has emerged in almost every medical problem. Stem cell has two features[71]: self-renewal and multipotency are instrumental for renewal, regeneration and repair. In the study of Zeinab and Rania etal, 14 patients with atrophic acne scar were given a single sessions of autologous bone marrow stem cells (BMSCs) therapy for 2days before bone marrow aspiration and the SC-containing solution was injected under each scar intradermally. It was observed for 6 months; the results show significant improvement in all types of scar with no significant adverse effects[72]. Stem cell therapy can be the new treatment method for atrophic scar in the future; more research has to be done in it.

CONCLUSION

Acne scar is one of the most common problem which often accompanied by physical, social, psychological and occupational disorder. Optimal management of Atrophicacne scar patients is complex and difficult. There are several therapeutic options to treat it. Treatment of acne scarring requires not only understanding of appropriate treatments for different scar types but also skilled execution of the procedure by the physician. None of the currently available treatments can achieve complete resolution of atrophic acne scars. The best method to prevent scarring is to treat acne early enough to minimize the extent and duration of inflammation. Combining different methods such asboth medical and surgical, and laser devices are useful in obtaining significant improvement.Further primary research such as randomized controlled trials is needed in order to quantify the benefits and to establish the duration of the effects, the cost-effective ratio of different treatments, and the evaluation of the psychological improvement and the quality of life of these patients. This review will help to understand the latest drugs and technology for the treatment.

Conflict Of Interest:

We declare that none of the authors have any financial and personal relationships with other people or organizations that can inappropriately influence the quality of the work presented in this manuscript. There is no professional or other personal interest of any nature or kind in any product, service and/or company that could be construed as influencing the position presented in, or the review of, the manuscript entitled "A review on Treatments of Atrophic Acne Scars"

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