



COTTAGE CHEESE SKIN

A COMPREHENSIVE REVIEW ON CELLULITE; A DISORDER OF SKIN

Latasha Shonkla, Rahul, Priyanka Sen

Assistant Professor of Pharmacology

Department of Pharmacology, L.R. Institute of Pharmacy, Solan (H.P.) -173223, India

E-mail: priyankasen1997ps@gmail.com

ABSTRACT

Cottage cheese skin (Cellulitis) is an infection of the deep dermal layer of skin and subcutaneous tissue. Cellulitis is an acute inflammation presenting with expanding erythema, warmth, tenderness, swelling, orange peel skin, and soft tissue skin infection. The most commonly involved areas are the leg, upper arm, breast, lower abdomen, hip, and thighs. It collects fat under the fibrous connective tissue. Cottage cheese skin is caused by staphylococcus and streptococcus group AB. It is divided into four parts. Various hormones and genes play an important role in cellulite growth. In diet, only toxins are not because by cellulite sometimes humans who eat more amounts of fat, sugar, and salt have more amount of cellulite. Skin flora plays an important role in reducing pathogenic clearing on the skin surface. The risk factor for cellulite is injury, weak immune system, skin condition, and lymphedema, obesity, wound. Cellulite can be treated by antibiotics like penicillin V, amoxicillin, etc., and some therapies.

Keywords: Cellulitis, Subcutaneous tissue, Inflammation, Lymphedema.

INTRODUCTION

CELLULITIS word derived from Latin 'CELLFULA' means CELL+ITIS which denotes inflammation. Other names of cellulite are orange peel skin and cottage cheese skin, gynoid lipodystrophy, and skin and soft tissue infections (SSTIs). Gynoid lipodystrophy can affect the natural beauty of females. It is defined as the infection of the deep dermal layer of the skin. It is an acute inflammation that can be identified by localized pain, swelling, and heat. The most commonly involved areas are the leg, upper arm, breast, lower abdomen, thighs, hip, and buttocks [1]. It collects fat under the fibrous connective tissue. It is a term for the development of lumps and dimples in the skin. Cottage cheese skin is cause by staphylococcus & streptococcus group AB, H. influenza. H. influenza is also known as pre-orbital cellulites which is commonly found in children. ERYSIPEALS are also the same as cellulites and it is caused by group streptococcus bacteria [2, 3]. Cellulites start when the entry point of normal skin allows bacteria (due to any cut) to enter the skin and show their toxins in subcutaneous tissue. Various hormones like estrogen, insulin, thyroid hormone, etc., and genes play important role in cellulite growth. In dietary only toxins are not cause cellulite, sometimes humans who eat

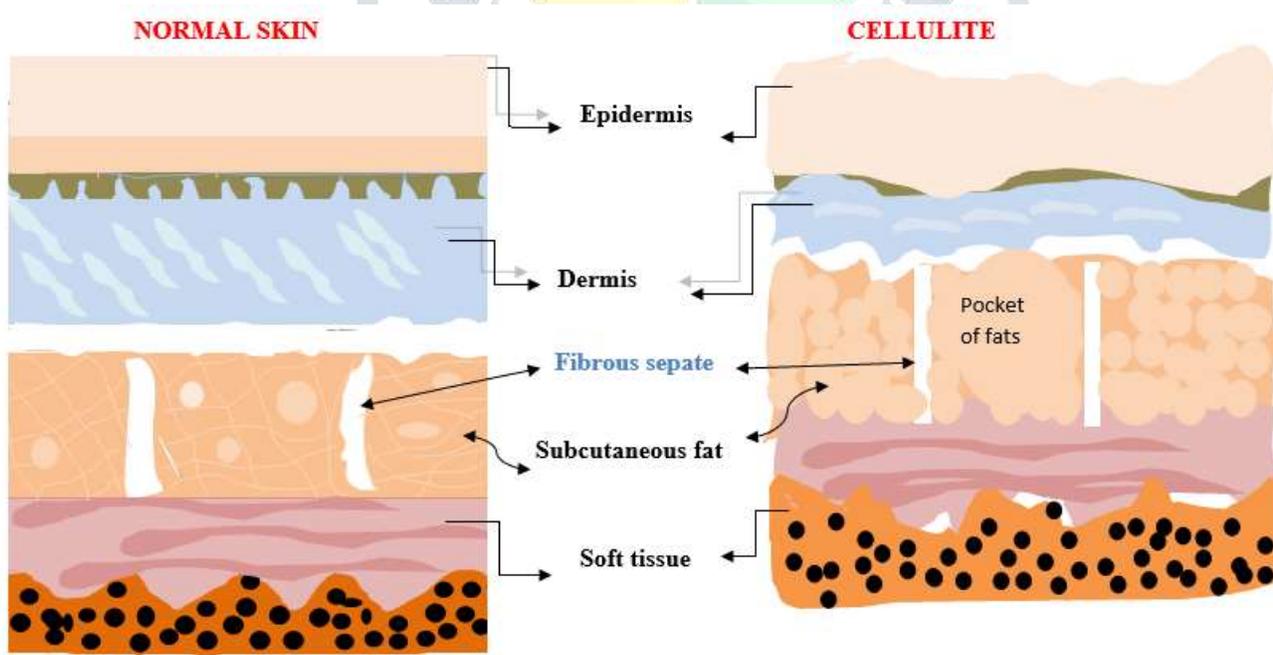
more amounts fat, sugar, and salt because of more amount of cellulite [4]. In cellulite, fat is stored in fatty cells of the body that join the skin and muscle tissue. Cottage cheese skin was first discovered by French doctors in 1922. It is non-purulent. The septae of men are aligned at 45° angles to the skin in a crisscrossing pattern, whereas women have septae aligned perpendicularly to the skin described on the basis of pathological studies [5]. Cellulite in healthy men is rare, but it occurs mainly due to androgen deficiency in men. Cellulitis is an acute, painful, and potentially serious bacterial infection of the skin and underlying tissue which causes pain, feeling very unwell, and affect limb that resulting in reduced quality of life and substantial periods of work absence [6]. Cellulite is recognized by skin alterations that have been described as “orange peel,” “cottage cheese,” or “mattress-like” in appearance primarily affecting the thighs and buttocks and sometimes the lower legs and abdomen [7]. The various types of cellulite are explained in table1 [8]. This review mainly focused on cellulite (cottage cheese skin) etiology and how it started in the body, its side effects, treatment, and drugs that are used in this.

Type-1	Loose skin cellulite
Type-2	Poor circulation cellulite
Type-3	Lack of exercise cellulite
Type-4	Genetic cellulite

Table1: Cottage cheese skin type

ETIOLOGY

In cellulite’s three principal theories are given- The first theory, planned by Rumberger and muller, the second theory, planned by mer51en and curri, and the third theory, planned by Gruber and Huber, drapes. 60% of humans are affected by lower limb cottage cheese skin [9].

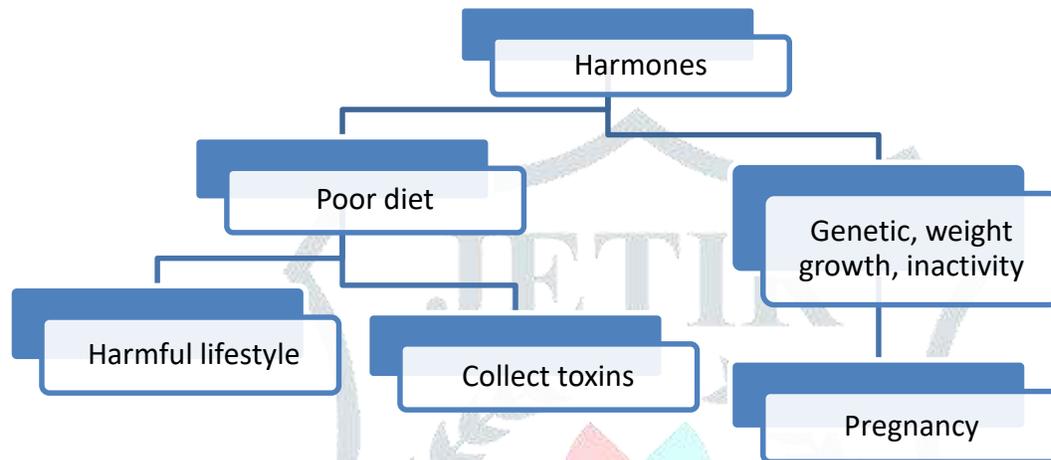


It is caused by staphylococcus aureus (S. aureus) and streptococcus pyogenes (S. pyogenic) or exogenous bacteria. Bacteria enter the body in different ways like a break in the skin, burns, insect bites, etc. cellulite is found in patients with chronic lymph edema and give the results in elephantiasis. Haemophilus influenza is a major virus in facial cellulite in young children. These infections are rare because of the type B vaccine [1]. Cellulite affects both men as well as women; approximately 80% to 90% of postpubertal women are

experiencing cellulite because of different arrangements of fat, muscle, and connective tissue which is manifested by dimpled outlines of the skin. For many women, cellulite is a major cosmetic concern that involves massage, cosmeceuticals, laser therapy, etc. (noninvasive) and minimally invasive techniques (subcision, collagenase injection) have been evaluated to improve the appearance of the affected skin [7]. On the basis of ethnicity, cellulite is more common in white women. In addition, lifestyle factors such as a high-carbohydrate diet or sedentary habits may promote cellulite formation [10].

CAUSE OF CELLULITE

Cellulite may be caused by [11]-:



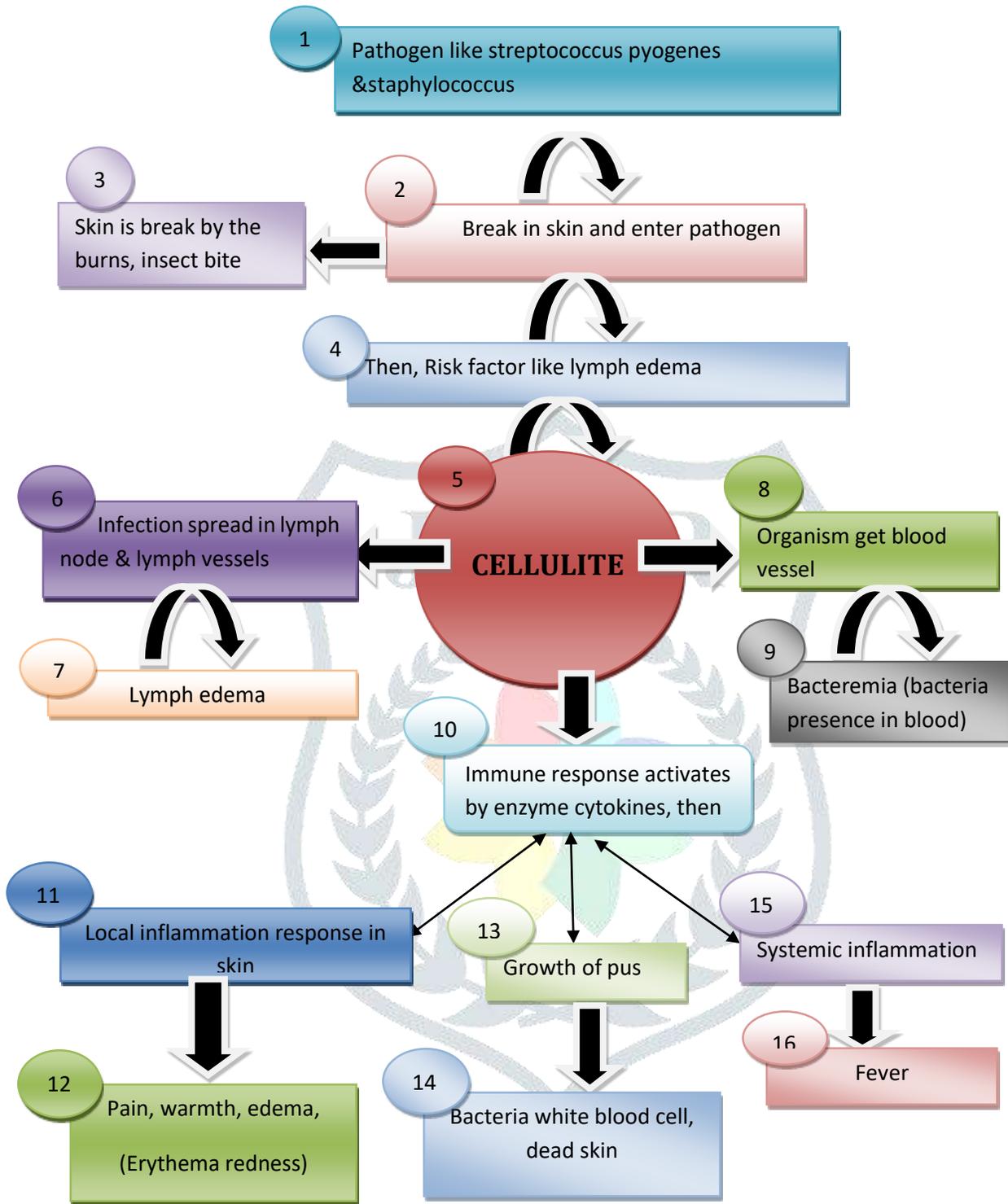
RISK FACTORS

Risk factors for the recurrence of cellulitis include previous episode(s) of cellulitis; diabetes and skin disorders producing breaks in the skin (e.g. fungal foot disease, dry skin) and others are listed below [9].

1. **Injury** –: Some cuts, fractures, and burn to give bacteria to the entry point to the skin.
2. **Weak immune system**-: Like leukemia, HIV, and AIDS.
3. **Skin condition**-: For example; eczema break in the skin.
4. **Lymph edema**-: Swelling in arms and legs.
5. **Obesity**-: increase risk of lower limb cellulite.
6. **Allergic reaction**-: any insect bite.
7. Fungal infection, Wound.

PATHOLOGY

Cellulites start when any infectious organism disrupted the dermis of the skin. This disruption of the skin can form causes including fungal infection, venous leg ulcers, and pressure ulcers. Skin flora plays an important role in reducing pathogenic clearing on the skin surface [12].



TREATMENT

Cellulite is a notable cosmetic concern for many women, and numerous treatment approaches have been employed in attempts to improve the appearance of affected skin. In reducing cellulite, non-invasive, non-surgical treatments and some invasive methods are also used [13, 14].

Radiofrequency:-Electrothermal effects of radiofrequency (RF) cause electricity to flow through the tissue which results in more superficial and subcutaneous heating, and the depth of penetration for multipolar and bipolar RF is reported as approximately half the distance between the 2 electrodes (often less than 2–4 mm).

Topical Creams:-Methylxanthines (e.g., caffeine) penetrate the skin and directly on adipose cells, promoting lipolysis. Small clinical studies (6 studies; $n = 212$ women) of topical caffeine (0.1%–13.0%), retinol, or a combination of both, reported significant improvement in cellulite severity.

Massage:-US Food and Drug Administration–approved mechanical massage system LPG Endermologie that uses positive pressure from 2 rollers and negative pressure from aspiration to the skin and subcutaneous tissue.

Extracorporeal shock wave therapy (ESWT) uses electrical energy to create mechanical disruption of targeted tissues without cytolysis, producing extracellular healing responses such as collagen remodeling and improvement of local blood circulation from neovascularization

Laser and Light-Based Devices:-Various in vitro and in vivo studies have suggested that low-level laser therapy (LLLT) activates a biological cascade and increases the production of collagen.

Liposuction:-Since the 1970s, liposuction has been the standard treatment for the removal of subcutaneous adipose tissue. Several studies have shown that targeting the collagen-rich fibrous septae in cellulite dimples through mechanical, surgical, or enzymatic approaches (with or without concomitant treatment of dermis or adipose) improves skin topography and produces durable improvement in the appearance of cellulite [5].

Obesity also plays an additional role in cellulite-prone skin zones such as the buttocks and thighs. It has been distinguished that women that are cellulite free had a better skin condition (more tightness, less laxity, compliance, and distortion ability) in the upper back portion of the thigh while women with cellulite have more loosening and shortcoming of the skin and soft tissue that is aggregated into the superficial layers of fascia [15].

Collagenase clostridium histolyticum-aes is composed of 2 purified bacterial collagenases given via injection (AUX-I and AUX-II [Clostridial class I and II collagenases]) that hydrolyze Type I and III collagen, resulting in disruption of targeted collagen structures. Collagenase clostridium histolyticum-aes proved to be safe and generally well tolerated [16].

Various other types of treatment used in cellulite: -

- **Medical course of action for reducing cellulite:** -Cryolipolysis, Ultrasound, Cellfina.
- **Laser and radiofrequency treatment:** - Cellulaze, Carboxytherapy [17].
- **Home remedies for the treatment of cellulite:** -Exercise, dry brushing, apple cider vinegar.

Firstly, rest the area of skin that is affected with cellulite, then upgrade the (which is affected by cellulite) area to reduce swelling and pain. Use over-the-counter drug pain relievers for example acetaminophen or ibuprofen to reduce the pain and fever down. Clindamycin is used in patients with penicillin allergy, moderate cellulite is explained as non-purulent and it is treated by oral antibiotics, and patients, who are failing in oral treatment, will be able to receive intravenous treatment (IV) with ceftriaxone, cefazolin penicillin G, and clindamycin [12]. Treatment with antibiotics is generally successful at the home but in some case, patients need hospital treatment, in a mild case of cellulite the doctor gives 7-14 days of oral antibiotic to patients and start improvement in 2 days, different type of antibiotics are used in the treatment of cellulite most of the cellulite patients recover in 2 weeks but the time to recover with cellulite is longer if the symptoms are strong, some patients which have strong cellulite need to hospital treatment like high fever and vomiting, in the hospital, many of cellulite patients receive intravenous antibiotic treatment with the help of drip that the drug delivery to the vein in the arm, there are different types of cellulite turn on where the infection starts like-

- Periorbital cellulite, which grows around the eyes and around the anal orifice
- Facial cellulite, which grows around the eye, nose, and cheeks
- Breast cellulite

Cellulite grows everywhere on the body involving the hands and feet, a mature person tends to grow cellulite in the lower leg, and children tend to grow it on the face and neck [18].

DIAGNOSIS

Cellulite is diagnosed with various types [19]-:

- Physical examination
- Blood test
- Blood culture
- Tissue culture.

PREVENTION

Examine body (like skin, feet) daily and moisturize skin systematically, trim fingernails and toenails carefully, wash injury or cut daily with soap and water then apply some protective creams, lotion or ointment, cover the injury or any cut with a bandage and watch the sign of infection, reduce the use of high sugar foods it may lead to the toxin and body fat.

ANTIBIOTIC REGIMENS FOR COTTAGE CHEESE SKIN

Various type of antibiotic is used in cottage cheese skin [2]: -

(A) For Mild Infection Treat 5-7 Days

Antibiotic	Adult Dose
Amoxicillin	500 mg po tid
Penicillin V	250-500 mg po q6h
Cephalexin	500 mg PO q6h
Dicloxacillin	500 mg po q6h
Ciprofloxacin	500 mg po bid

(B) For Moderate Systemic Infection

Vancomycin	15 mg/kg IV bid
Ceftriaxone	1-2 g IV daily
Penicillin G	2-4 million units IV q4-6h
Linezolid	600 mg PO bid
Daptomycin	4 mg/kg IV q24h

(C) For Severe Systemic Infection

Vancomycin - Piperacilline – Tazobactam	15 mg/kg IV bid + 4.5 g IV q8h
Vancomycin - Imipenem – Cilastatin	15 mg/kg IV bid + 500 mg IV q6h
Benzathine penicillin	1.2 million units IM q2-4 weeks

CONCLUSION

Based on this review, it is concluded that cellulite is a complex process and is a serious cosmetic concern for most of the people affected by it. In a mild case of cellulite, it is improved by empiric antibiotic treatment, or in the moderate case, it is harder to treat, cottage cheese skin is the infection of the deep dermal layer of the skin and can be identified by the pain, swelling, etc. It is caused by the streptococcus bacteria and it is seen in patients with chronic lymph edema. It affects both men and women but it affects 90% of women. It starts when any infection organism disruption causes the fungal infection and pressure ulcer etc. cellulite shows various symptoms like Harmon, poor diet, genetic, etc. These various risk factors include injury, skin condition, obesity, and allergic reaction. The treatment for cottage cheese skin is by synthetic drugs and home remedies. Many Antibiotics can be given for the treatment like penicillin V, amoxicillin, Cephalexin, ciprofloxacin, etc. Cellulite can be prevented by examining the body regularly, trimming fingernails, and toenails, washing the injury daily with soap, etc. it can be diagnosed in various ways like physical examination, blood test, blood culture, and tissue culture. Further, research is still needed to explain ideal management guidelines.

REFERENCES

1. Maitre, Sarah, **2006**, “Cellulite: definition, etiology, diagnosis, and treatment”, *American Medical Association Journal of Ethics*, vol. 8 (12): 831-833.
2. Karl T. Clebak, MD, MHA, FAAFP; Alexis Rrrdy-Cooper, MD, MPH; Michael T. Partin, MD; Christopher R. Davis, MD, **2021**, “ A guide to the Tx of cellulitis and other soft-tissue infections”, *The Journal Of Family Practice*, vol. 70: 5.
3. Sullivan, Tadhg and Barra, Eoghan de, **2018**, “Diagnosis and management of cellulitis”, *Clin Med (Lond)*, vol.18 (2): 160-163.
4. Medically reviewed by M.D, Catherine Hannan – Written by Crosta, Peter on November 30, **2017**.
5. Lawrence S. Bass, Michael S. Kaminer, **2020**, “Insights into the Pathophysiology of Cellulite: A Review” *Dermatol Surg*, Vol. 46(1): S77–S85.
6. E.J. Teasdale, A. Lalonde, I. Muller, J. Chalmers, P. Smart, J. Hooper, M. El-Gohary, K.S. Thomas, M. Santer, **2019**, “Patients’ understanding of cellulitis and views about how best to prevent recurrent episodes: mixed-methods study in primary and secondary care”, *Br J Dermatol.*, vol.180(4): 810–820.
7. V Leroy Young, Barry E DiBernardo, **2021**,” Comparison of Cellulite Severity Scales and Imaging Methods”, *Aesthet Surg J.*, vol.2021 Jun; 41(6): NP521–NP537.
8. Cellulite by the Rachael Ray Staff on **07/14/2017**.
9. Patel M, Lee SI, Levell NJ, Smart P, Kai J, Thomas KS, Leighton P, **2020**, “An interview study to determine the experiences of cellulitis diagnosis amongst health care professionals in the UK” *BMJ Open*, vol.10:e034692.

10. Khan MH, Victor F, Rao B, Sadick NS, **2010**, “Treatment of cellulite: part I. Pathophysiology”, *J Am Acad Dermatol.*, vol. 62(3): 361-370.
11. Kranendonk, D.R.; Lavrijsen, A.P.M.; Prins, J.M.; Wiersinga, W.J., **2017**, “Cellulitis: current insights into pathophysiology and clinical management”, *The Netherland Journal of Medicine*, vol. 75: 9.
12. Albuainain, Khalifa May’ ouf.; Aljuwayd, Abduljabber Abdullah.; Almarzouq, Ahmed Abdullah.; AlSaud, Zainab Ali A. Abu.; Alkhattaf, Nouf Abdullah Maziad.; Alabdrabalrasol, Eman Ahmed.; Zamzamy, Nedaa Ahmed.; Al- Lashit, Abaas Hassan.; Al- Saad, Mahdi Hussain, **2018**, “Cause and Management of Cellulitis”, *Egyptian Journal of Hospital Medicine*, vol. 70(12): 2148-2151.
13. Luebberding S, Krueger N, Sadick NS, **2015**, “Cellulite: an evidence-based review”, *Am J Clin Dermatol.*, vol. 16(4): 243-256.
14. Anna Piotrowska, Olga Czerwińska-Ledwig, Małgorzata Stefańska, Tomasz Pałka, Marcin Maciejczyk, Przemysław Bujas, Marek Bawelski, Tomasz Ridan, Małgorzata Żychowska, Ewa Sadowska-Krępa, Agnieszka Dębiec-Bąk, **2022**, “Changes in Skin Microcirculation Resulting from Vibration Therapy in Women with Cellulite”, *Int J Environ Res Public Health*, vol. 19(6): 3385.
15. Esraa H. Rostom, Amr B. Salama, **2022**, “Vodder manual lymphatic drainage technique versus Casley-Smith manual lymphatic drainage technique for cellulite after thigh liposuction”, *Postepy Dermatol Alergol*, vol. 39(2): 362–367.
16. Joely Kaufman-Janette, John H. Joseph, Michael S. Kaminer, James Clark, Sabrina G. Fabi, Michael H. Gold, Mitchel P. Goldman, Bruce E. Katz, Kappa Peddy, Joel Schlessinger, V. Leroy Young, Matthew Davis, David Hurley, Genzhou Liu, Michael P. McLane, Saji Vijayan, Lawrence S. Bass, **2021**, “Collagenase Clostridium Histolyticum-aes for the Treatment of Cellulite in Women: Results From Two Phase 3 Randomized, Placebo-Controlled Trials”, *Dermatol Surg.*, vol. 47(5): 649–656.
17. MD, Pinar Avci.; MD Nyame, T.T.; Gupta, G.K.; MD, Ph.D., Sadasivam, M. MTEch, Hamblin M.R., **2013**, “Low-Level Laser Therapy for Layer Reduction: A Comprehensive Review”, *Lasers Surg Med.*, vol.45(6): 349-357.
18. Medically reviewed by Alana Biggers, M.D., MPH- Written by Yvette Brazier, **2019**, august19.
19. Dupont, E.; Journet, M.; Oula, M.L.; Gomez, J.; Leveille, C.; Loing, E.; Bilodeau, D, **2014**, “An integral topical from a double-blind, randomized, placebo-controlled evaluation of efficacy”, *Clin Cosmet Invest Dermatol*, vol. 20: 73-88.