



Case Report

Short Term of Oral and Topical Use of Organic Silicon in Increasing Dermal Thickness: A Case Report

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Abstract

Menopause is an age-related factor that profoundly alters the structures and quality of the skin. In this study, researchers tested the oral supplementation of organic silicon (200mg) and topical use of silicon (5%).

Three post-menopausal women were recruited and divided into three groups: oral use, topical use, and oral and topical use. The treatment lasted for 30 days. Ultrasound imaging tests were performed to assess dermal thickness of the skin in four distinct regions of the face. After 30 days of treatment, was observed an improvement in the dermal thickness in the three treatments, but the most expressive results was observed in the woman who used oral and topical use. Thus, the association of organic silicon may be promising in improving skin quality associated with menopause.

Introduction

The skin tissue undergoes profound changes during the aging process. Anatomical and histomorphological alterations show a reduction in dermal thickness and decrease in collagen fibers that clinically manifest themselves with wrinkles formation in the skin [1]. Some strategies aim to reverse this process. Nowadays, dermatologists have available many anti-aging strategies, including preventive measurements, cosmetological strategies, invasive procedures, and oral and topical therapeutic agents [2]. Silicon (Si) has an important role in the maintenance of numerous body tissues [3]. In connective tissues, this nutrient maintains the integrity of the extracellular matrix components [4]. In the skin, silicon deprivation reduces hydroxyproline synthesis and can affect collagen content in the tissue [5]. Thus, knowing the importance of silicon, this case report aimed to evaluate the dermal thickness and the improvement of the aesthetic parameters of the skin after oral supplementation and the topical use of Si.

Case Report

In this case report, three women, all menopausal, aged between 57 and 67 years, underwent three different interventions. The first woman took orally, once a day, 200mg of organic silicon stabilized in marine collagen (OS) orally. The second woman, applied topically to the face 5% methylsilanol manuronate (ST) twice a day (morning and night). The third woman took orally, once a day, 200mg of organic silicon stabilized in marine collagen orally and applied topically to the face, twice day (morning and night), 5% methylsilanol manuronate (OS + ST). All women underwent ultrasound evaluation of the left and right mentonian face regions. Three measurements of the chin regions (M1, M2, and M3) were taken, obtaining the average skin dermal thickness in millimeters. Ultrasound assessments were performed in October 2021, one at the beginning of the month (T0) and another after 30 days (November 2021) of intervention (T1).

An increase in dermal thickness was observed in both treatments. In the OS + ST, there was an increase of 21% in the right mental region (T0: 1.4 mm; T1: 1, 7 mm) and 20% (T0: 1.5 mm; T1: 1, 8 mm) in the left region (Table 1 and Figure 1).

Region	Intervention	M1	M2	M3	MEDIA
Right	14/10/2021	1,3 mm	1,4 mm	1,5 mm	1,4 mm
	16/11/2021	1,7 mm	1,8 mm	1,8 mm	1,7 mm
Left	14/10/2021	1,6 mm	1,5 mm	1,4 mm	1,5 mm
	16/11/2021	1,8 mm	1,7 mm	1,8 mm	1,8 mm

M1, M2, M3 - analysis point.

Table 1: Changes in dermal thickness in the mental region after oral and topical silicon.

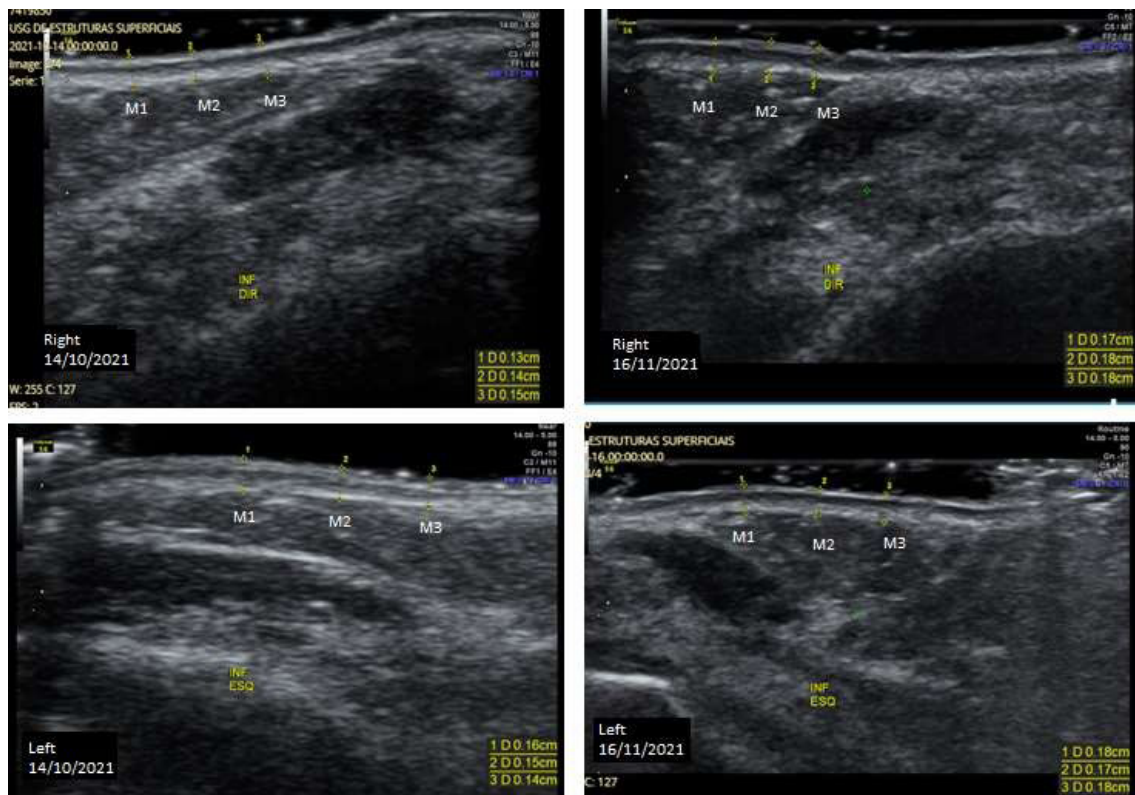


Figure 1: Right and left chin evaluation by ultrasound imaging after oral and topical silicon.

In the OS treatments there was an 11% increase in the right mental region (T0: 1, 8 mm; T1: 2, 0 mm) and 23% in the left region (T0: 1.7 mm; T1: 2, 1 mm) (Table 2 and Figure 2).

Region	Intervention	M1	M2	M3	MEDIA
Right	14/10/2021	1,7 mm	1,7 mm	2,0 mm	1,8 mm
	16/11/2021	2,0 mm	2,0 mm	2,2 mm	2,0 mm
Left	14/10/2021	1,7 mm	1,7 mm	1,8 mm	1,7 mm
	16/11/2021	2,4 mm	1,9 mm	2,0 mm	2,1 mm

M1, M2, M3 - analysis point.

Table 2: Changes in dermal thickness in the mental region after oral organic silicon supplementation.

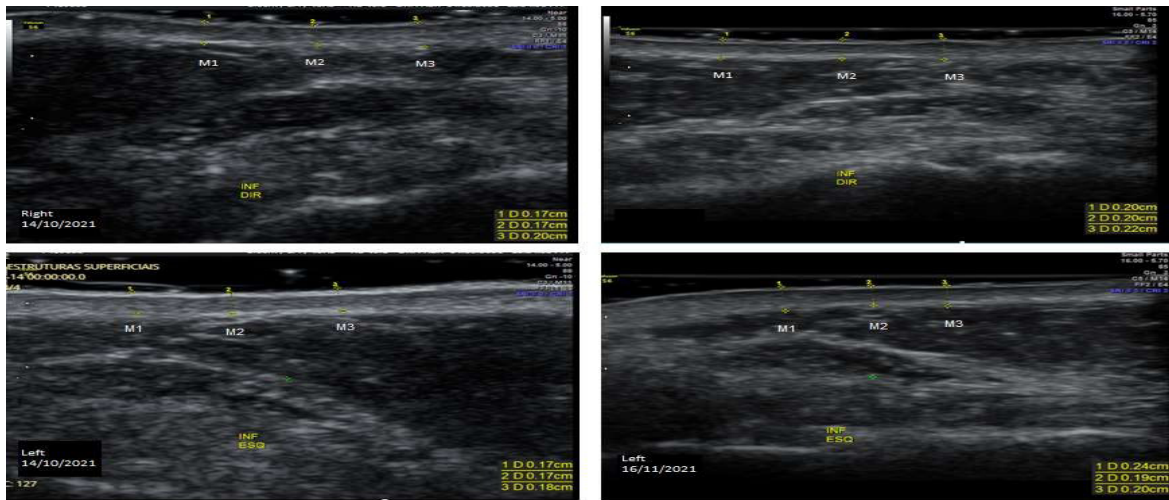


Figure 2: Right and left chin evaluation by ultrasound imaging after oral organic silicon supplementation.

In the ST treatments, there was a 5% increment in the right mental region (T0: 1.8 mm; T1: 1.9 mm) and no differences in the increment in the left region (T0: 1.9 mm; T1: 1.93 mm) (Table 3 and Figure 3).

Region	Intervention	M1	M2	M3	MEDIA
Right	14/10/2021	2,0 mm	1,8 mm	1,7 mm	1,8 mm
	16/11/2021	1,9 mm	2,0 mm	2,0 mm	1,9 mm
Left	14/10/2021	1,9 mm	1,9 mm	1,9 mm	1,9 mm
	16/11/2021	1,8 mm	2,0 mm	2,0 mm	1,93 mm

M1, M2, M3 - analysis point.

Table 3: Changes in dermal thickness in the mental region after topical silicon.

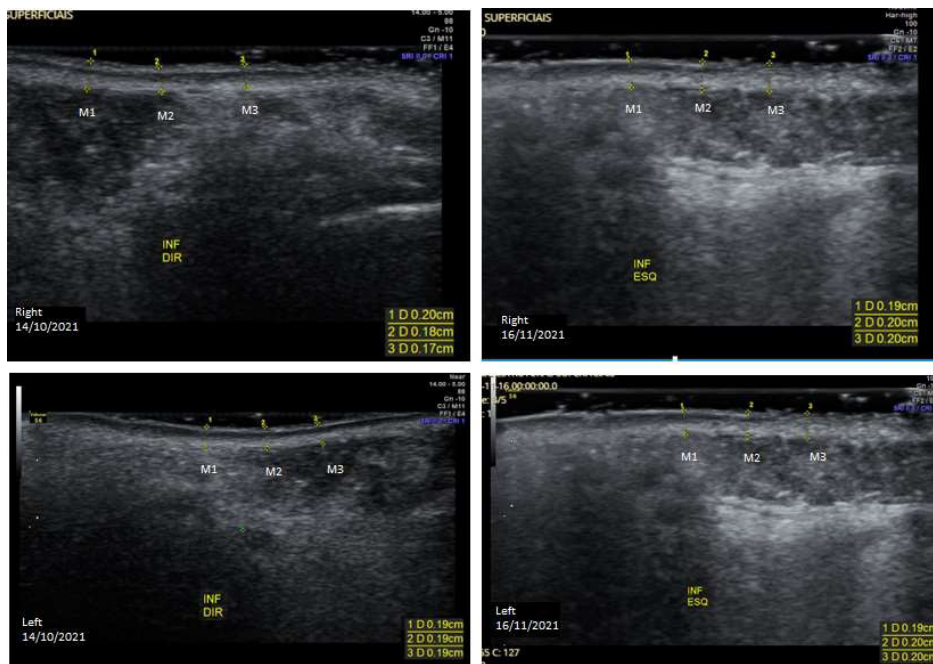


Figure 3: Right and left chin evaluation by ultrasound imaging after topical silicon.

Discussion

The skin is a highly dynamic structure that responds to many of factors [6]. During the aging process, the amount of collagen in the skin tissue declines and leads to dermal atrophy [7]. Thus, it is observed that with aging, the dermal thickness reduces and contributes to the formation of wrinkles [8]. Menopause is a critical period associated with skin aging. At this stage of life, the reduction in estradiol levels reduces the activity of skin cells, especially fibroblasts, leading to dermal atrophy [9]. In an elderly individual, for example, the amount of collagen in the skin is almost 70% lower than a young individual. In this case report, all the women were in menopause and both showed signs of aging on the skin of the face.

There are many strategies to increase collagen synthesis in the skin and reduce the aging process. Aesthetic therapies range from the most invasive, such as collagen bio stimulators, to non-invasive, such as radiofrequency [2]. In this case report, we opted for the oral supplementation of organic silicon (Exsunutriment®) and the topical application of silicon (Algiusum C®) on the face.

Nutritional support is critical for healthy skin. [10] Collagen production is dependent on nutrients and its deficiency can compromise its synthesis [11]. In addition, many nutrients such as vitamin C, vitamin E and vitamin A act as antioxidants in the skin, preventing the action of free radicals in the tissue that accelerate the aging process [12].

Silicon has been described as having an important function in the formation and maintenance of connective tissue [13]. It is involved in collagen and elastin synthesis and there is increasing evidence to suggest that it may be important for the normal health of the connective tissues [14]. It has been clinically demonstrated that silicon has similar beneficial effects on skin collagen [15]. Kalil, et al. [16] aimed to evaluate the potential of stabilized silicon using a hydrolyzed marine collagen molecule (Exsynutriment®). This work was conducted on 22 male and female volunteers, between 40 and 60 years old, and involved 90 days of supplementation with 1 capsule a day (400mg). The volunteers were divided in two groups: those who received the active ingredient and those administered the placebo. After the treatment period, there was a significant difference in skin, texture and hydration.

Topical actives are also applied to the skin to reduce the effects of aging. Many substances act as antioxidants and stimulate collagen production in the tissue [17]. Silicon has good permeability when applied to the skin and can work on dermal structures. A study conducted by COSTE [18] evaluated the topical use of silicon in the improvement of skin parameters associated with aging. The authors observed that after three months of treatment, there was a fivefold increase in silicon in the dermis, accompanied by a reduction in skin wrinkles. The increase in dermal thickness

was greater with topical use compared to oral use. Probably, the greater use makes threads available with a greater amount of silicon in the tissue, thus promoting greater collagen stimulation and a dermal density.

Conclusion

In the present study, we observed that in both treatments, there was an improvement in the dermal thickness in the chin region of the face, but the best results were observed with the association of supplementation oral together with the topical use of silanols.

The present study brings promising results on the daily consumption of 200mg of organic silicon per day with a topical application of 5% silanol, twice a day. However, there is a need for long-term follow-up on the effects of silicon on the skin.

References

1. Baroni Erv, Biondo-Simões MLP, Auersvald A, Auersvald LA, Netto MRM et al. (2012) Influence of aging on the quality of the skin of white women: the role of collagen. *Acta Cir. Bras.* 27: 736-740.
2. Mane S, Vinchurkar K, Khan M, Sainy J, Nirmal S, et al. (2019) Skin anti-aging strategies: a review. *International Journal of Engineering Applied Sciences and Technology*, 4: 255-263.
3. Nielsen FH (2014) Update on the possible nutritional importance of silicon. *Journal of Trace Elements in Medicine and Biology*, 28: 379-382.
4. Jugdaohsingh R (2007) Silicon and bone health. *J Nutr Health Aging*, 11: 99-110.
5. Seaborn CD, Nielsen FH. (2002) Silicon deprivation decreases collagen formation in wounds and bone, and ornithine transaminase enzyme activity in liver. *Biol Trace Elem Res*. 89: 251-256.
6. Farage MA, Miller KW, Elsner P, Maibach HI (2008) Intrinsic and extrinsic factors in skin ageing: a review. *International Journal of Cosmetic Science*, 30: 87-95.
7. Ji MS, Yang XY, Hao Y, Shi J (2022) Histomorphological and biochemical analysis of rat model of menopausal skin aging. *Bulletin of Experimental Biology and Medicine*, 172: 377-380.
8. Baumann L (2007) Skin ageing and its treatment. *J Pathol*. 211: 241-251.
9. Raine-Fenning N, Brincant MP, Muscat-Baron Y (2003) Skin Aging and Menopause Implications for Treatment. *Am J Clin Dermatol*. 4: 371-378.
10. Verani J, Dame MK, Rittie L, Fligiel SEG, Kang S, et al (2006) Decreased Collagen Production in Chronologically Aged Skin Roles of Age-Dependent Alteration in Fibroblast Function and Defective Mechanical Stimulation. *American Journal of Pathology*, 168: 1861-1868.
11. Kjaer M, Frederiksen AKS, Nissen Ni, Willumsen N, Van Hall G, et al. (2020) Multinutrient Supplementation Increases Collagen Synthesis during Early Wound Repair in a Randomized Controlled Trial in Patients with Inguinal Hernia. *The Journal of Nutrition*; 150: 792-799.

12. Shamloul N, Hashim PW, Nia JK, Farberg AS, Goldenberg G, et al. (2019) The Role of Vitamins and Supplements on Skin Appearance. *Cutis*. 104: 220-224.
13. Jugdaohsingh R, Watson AI, Pedro LD, Powell JJ (2015) The decrease in silicon concentration of the connective tissues with age in rats is a marker of connective tissue turnover. *Bone*, 75: 40-48.
14. Nielsen FH (2014) Update on the possible nutritional importance of silicon. *J Trace Elem Med Biol*, 28: 379-382.
15. Barel A, Calomme M, Timchenko A, De Paepe K, Demeester N, et al. (2015) Effect of oral intake of choline-stabilized orthosilicic acid on skin, nails and hair in women with photodamaged skin. *Arch Dermatol Res*. 297: 147-153.
16. Kalil CLPV, Campos V, Cignachi S, Izidoro JF, Reinehr CPH, et al. (2018) Evaluation of cutaneous rejuvenation associated with the use of ortho-silicic acid stabilized by hydrolyzed marine collagen. *J. Cosmet. Dermatol*. 17: 814-820.
17. Martins TEA, de Oliveira Pinto CAS, de Oliveira AC, Guitierrez ARG, Rafael MFC, et al. (2020) Contribution of Topical Antioxidants to Maintain Healthy Skin-A Review. *Sci. Pharm*. 88: 2-17.
18. Coste E, Valenti L, Markioli P-g (2020) The science of Silanols – from empirical to hi-tech skin care benefits. *South African Pharmaceutical and Cosmetic Review*, 48: 340-345.