Multiple miliary osteoma of the face. Three cases treated with carbon dioxide laser

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Abstract

We describe three multiple miliary osteoma of the face (MMOF) patients with and without a history of acne prior to the appearance of lesions. They were treated with carbon dioxide (CO_2) laser with good cosmetic results. MMOF constitute a rare variant of osteoma cutis, described almost exclusively in women with history of acne vulgaris.
The objective of the work is to show the usefulness of CO_2 laser in the treatment of MMOF and its cosmetic results. Through our experience, we consider that CO_2 laser is a therapeutic option for this condition of difficult approach (Dermatol Argent 2009; 15(2):111-116).

Key words: *osteoma cutis, acne, multiple miliary osteomas, carbon dioxide laser.*

Introduction

Multiple miliary osteoma of the face (MMOF) represents a rare variant of osteoma cutis (OC), in most cases affecting young or middle-aged women with a history of acne vulgaris. OC may be classified as primary or secondary, according to the absence or the presence of preexisting lesions, mainly severe acne, nevi, collagen disorders, scars, and basal cell epithelioma, among others. Primary lesions may be associated with Albright's syndrome, and then be classified as MMOF, isolated osteoma, widespread osteoma, and congenital platelike osteoma.
We report three patients with MMOF treated with CO_2 laser and subsequent lesion curettage. The result was cosmetically acceptable, with minimum scarring of the treated areas and without pigmentation changes after 2 to 10 months follow-up.
Multiple treatments have been reported for this conditions, such as topical tretinoin, dermabrasion, simple surgical excision, and erbium:YAG laser. Only one paper in international literature reports very good cosmetic results in treating MMOF with CO_2 laser. Our experience provided good results, comparable with previous reports, which lead us to believe that the applied procedure may be a treatment of choice for this rare condition of difficult therapeutic approach.

Clinical cases (Table 1)

Case 1

A 62-year-old female patient consulting about the presence of multiple 1.5-3 mm-diameter whitish formations, hard

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TABLE 1.

Data	Case 1	Case 2	Case 3
Sex	F	F	F
Current age	62	74	32
Age at onset	52	25	20
History of acne	(-)	(cannot remember)	(+)
Location	Cheeks	Cheeks	Cheeks

in consistency, covered by normal skin, asymptomatic, located on both cheeks, of a10-year evolution (**Figure 1**). She referred no acne or previous lesions, and had previously been studied for thrombocytopenia and treated with methylprednisone. A biopsy was performed for a presumptive diagnosis of OC, resulting in mature bone spicles with internal bone marrow tissue located in deep dermis and subcutaneous cellular tissue, thus confirming diagnosis (**Figure 2**). Laboratory studies (blood cell count, liver function test, renal profile, calcium and phosphorus dosage in blood and urine, proteinogram, and ESR) were within normal ranges.

Case 2

A 74-year-old female patient consulting about whitish 1 to 5 mm-diameter lesions, hard in consistency, asymptomatic, on both cheeks. She referred their presence since the age of about 25, and a history of various unsuccessful acne treatments (**Figure 3**). She did not recall having acne in her youth. Her personal history included hypertension treated with enalaprile 10 mg/day. Presumptive diagnosis of OC was confirmed by biopsy. Routine blood tests, and calcium and phosphorus dosages in blood and urine were normal.

Case 3

A 32-year-old female patient consulting about multiple whitish 2-mm-diameter lesions and 15 mm-diameter plates hard in consistency, asymptomatic, on both cheeks, of a 12-year evolution (**Figure 4**). She referred that she had received antibiotic and topical treatment for acne since the age of 20, without other health problems. Biopsy confirmed OC diagnosis. Blood and urine tests were normal.

Treatment and evolution

CO_2 laser treatment was started after obtaining informed consent from the patients. Topical anesthesia with 5 percent lidocaine and 3 percent prilocaine was used in occlusive ointment 2 hours before treatment. Continuous CO_2 laser at 1 to 2 watts was applied until the osteoma could be visualized

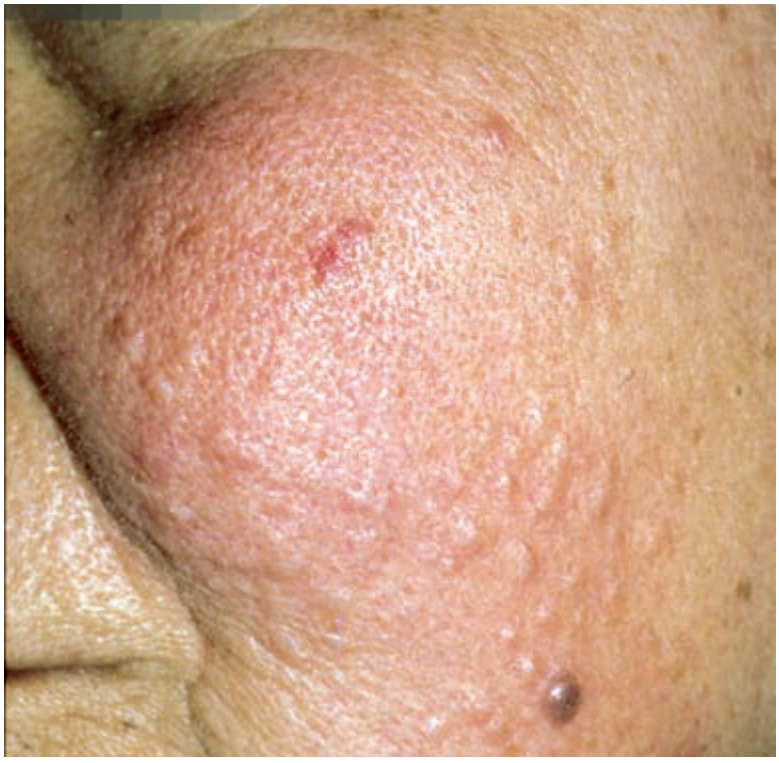

Figure 1. *Patient 1. Pre-treatment MMOF lesions on left cheek.*

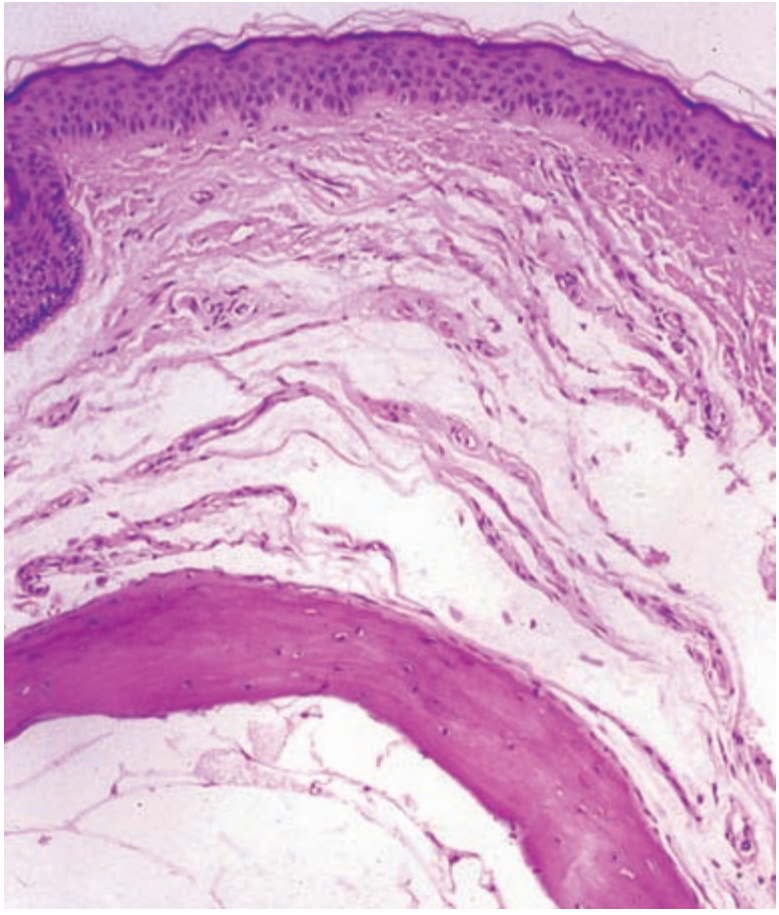

Figure 2. *Histopathology showing mature bone formation on reticular dermis.*

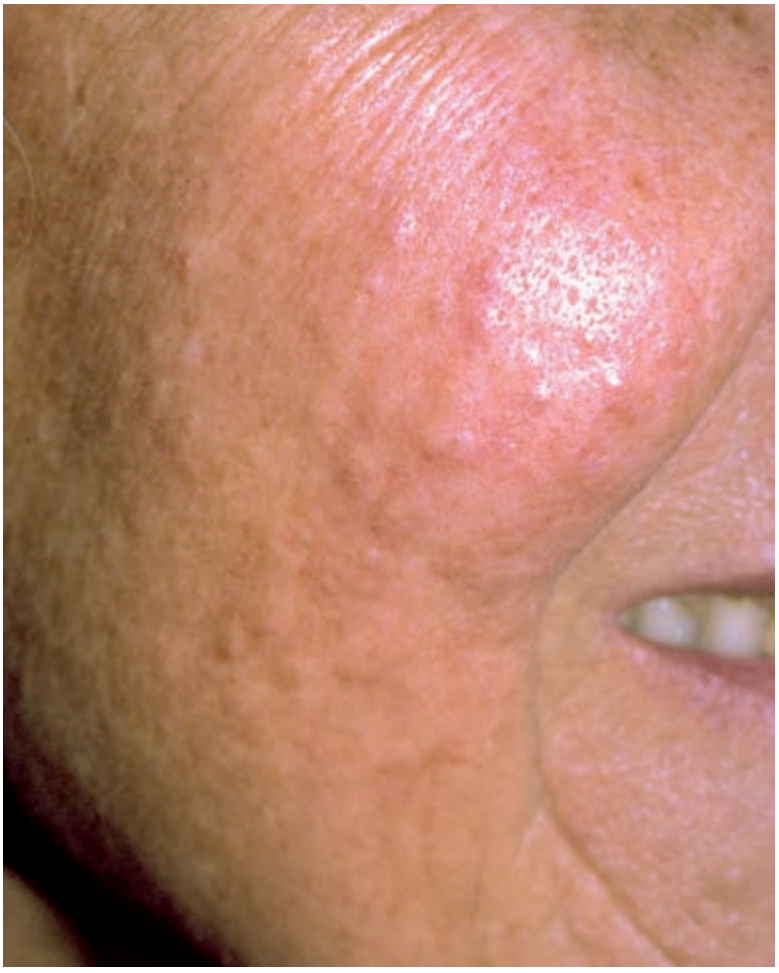

Figure 3. *Patient 2, pre-treatment. Multiple indurated acne-like lesions on cheeks.*

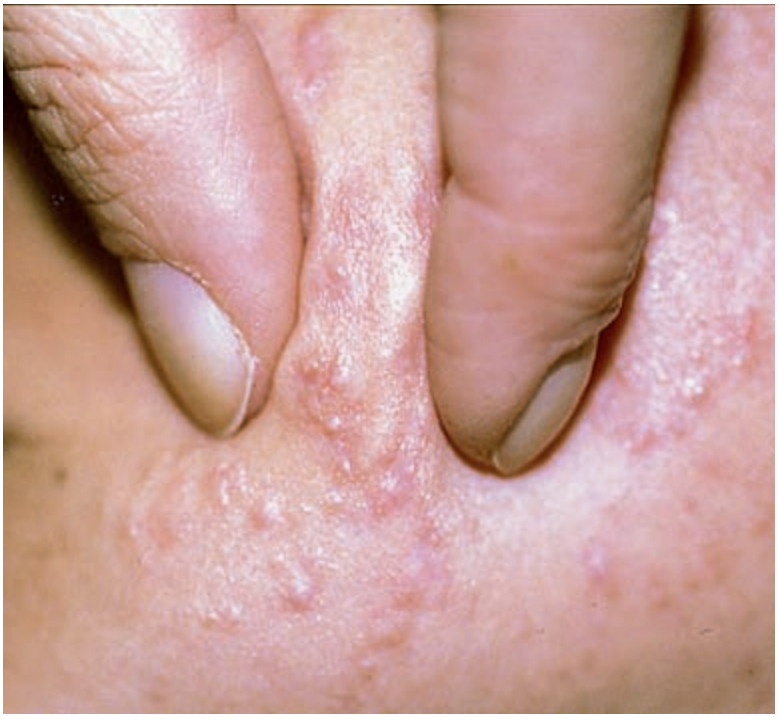

Figure 4. *Patient 3, pre-treatment. Variable size MMOF covered by erythematous skin.*

(**Figure 5**). Then, the osteoma was excised with a curette (**Figure 6**). A fusidic acid cream was indicated for curing twice a day.

The procedure was well tolerated by the patients, with appearance of crusts on the treatment site 7 days later, and resolution with minimal scar after 2 months, without pigmentation changes (**Figure 7**).

Discussion

The skin may be the target organ of a rare phenomenon: the formation of extraosseous bone (heterotopic ossification), known as osteoma cutis (OC).[1] This process may be classified as primary (neoplastic) or secondary (metaplastic) according to the absence or the presence of preexisting cutaneous lesions (**Table 2**).

Primary variant may appear in two forms: associated with Albright's hereditary osteodystrophia (pseudo-hypoparathyroidism and pseudo-pseudo-hypoparathyroidism), or without such association, as an essential differentiation in determining the patient's prognosis.[2,3] If the association is not present, OC may be subclassified in four clinical forms: multiple miliary osteoma of the face (MMOF), isolated osteoma, widespread osteoma, and congenital platelike osteoma.[4]

MMOF like those described in our patients occur as multiple papules, 1 to 4 mm in diameter, whitish or bluish, firm in consistency, and asymptomatic. Most frequent location is on the face,[5-7] although other areas such as the upper part of the trunk have been described.[8,9] Lesions of similar characteristics occur on isolated[10] and widespread[11] osteoma (which may be larger), while congenital platelike osteomas are

TABLE 2. CLASSIFICATION OF OSTEOMA CUTIS (OC).

Primary OC	• Associated with Albright's hereditary osteodystrophy • Not associated with Albright's hereditary osteodystrophy: o MMOF o Isolated o Widespread o Platelike
OC secondary to	• Severe acne • Nevi • Scleroderma • Dermatomyositis • Basal cell epithelioma • Scars • Venous stasis • Epithelioma of Malherbe • Systemic lupus erythematosus • Histiocytoma • Late syphilis lesions

characterized by subcutaneous masses hard in consistency, of a few to several centimetres in diameter, covered by normal or erythematous skin, present since birth or occurring in the first two years of age, preferably located on scalp.[12,13]

Secondary or metaplastic OC is a dominant presentation form. Most frequent development occurs as a sequel of severe acne (in which case they are described in the literature as secondary MMOF), and less frequently they appear subsequent to trauma, nevi, scleroderma, dermatomyositis, lupus, basal cell epithelioma, scars, venous stasis, epithelioma of Malherbe, histiocytoma, and late syphilis lesions, among others.[7,10,14]

In regard to etiopathogenesis, the extraskeletal bone formation mechanism has not yet been elucidated, as well as the higher prevalence in women of this phenomenon. Multiple explanatory theories coexist; some authors suggest that the bone may arise from pluripotential mesenquimal cells in embrionary nests, and differentiate into osteoblasts, but the triggering event is unknown.[2] Long time inflammation (such as in severe acne) may be a triggering factor of such differentiation.[5] Other authors have speculated about the skin fibroblasts being able to differentiate into osteoblast cells.[7,15] Oikarinen et al., found by *in situ hybridization* of fibroblasts surrounding an OC a messenger RNA of type I collagen (Col-I) in higher levels than appropriate to normal skin. This increase may indicate active deposit of Col-I representing the most important collagen present in bone. By the same technique, these cells showed an increase in osteonectin, a calcium binding glycoprotein involved in bone formation, which may suggest a coordinate regulation between collagen and osteonectin. In the same study, immunohistochemistry techniques determined the increase in pro-collagen III and tenascin in close relation with OC lesions, with both elements present during the processes of wound healing and epidermal regeneration, respectively. Thus, the bone formation may possibly be parallel to the wound healing process (when active formation of connective tissue occurs), taking into account its frequent development in acne scars or secondary to inflammatory processes.[15]

Histopathologically, it is characterized by showing true bone located in superficial and deep dermis. It appears as concentric, lamellar mature bone, with a central bone marrow cavity.[16] Ultrastructure shows macrocalcification areas comprising lamellar bone with Haversian canals containing osteocytes and osteoblasts, and microcalcification areas located near the calcified plate consisting of osteoid tissue harbouring osteoblast-like cells.[16]

X-ray difraction studies confirm that the main component of OC is hydroxyapatite cristals.[14]

MMOF have no malignant transformation potential; however, affected patients require treatment to prevent the appearance of new lesions, as well as to remove the existing ones. Preventive treatments with disodium etidronate have been reported, with minimal results.[3,8] Long-term

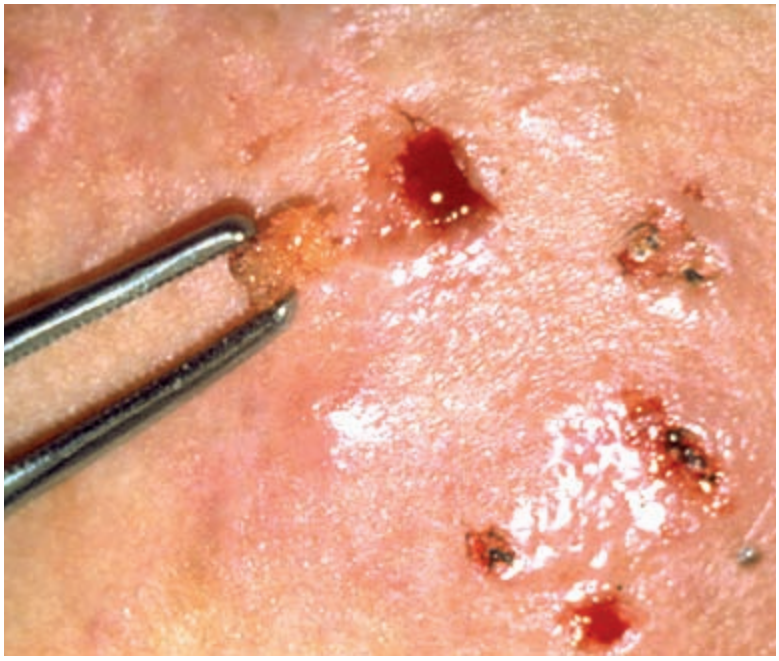

Figure 5. *Osteoma extraction with CO_2 laser and curettage.*

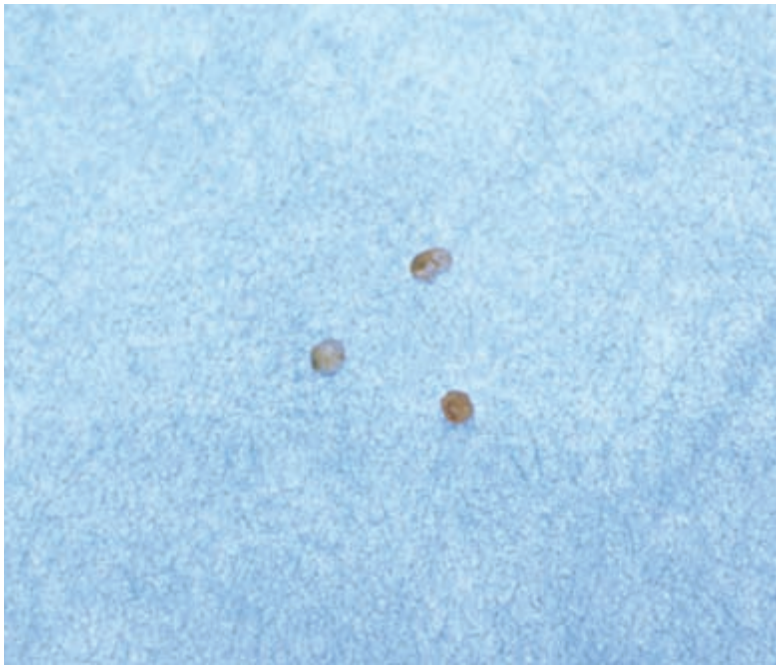

Figure 6. *Bone concretions, 1 to 2 mm in diameter.*

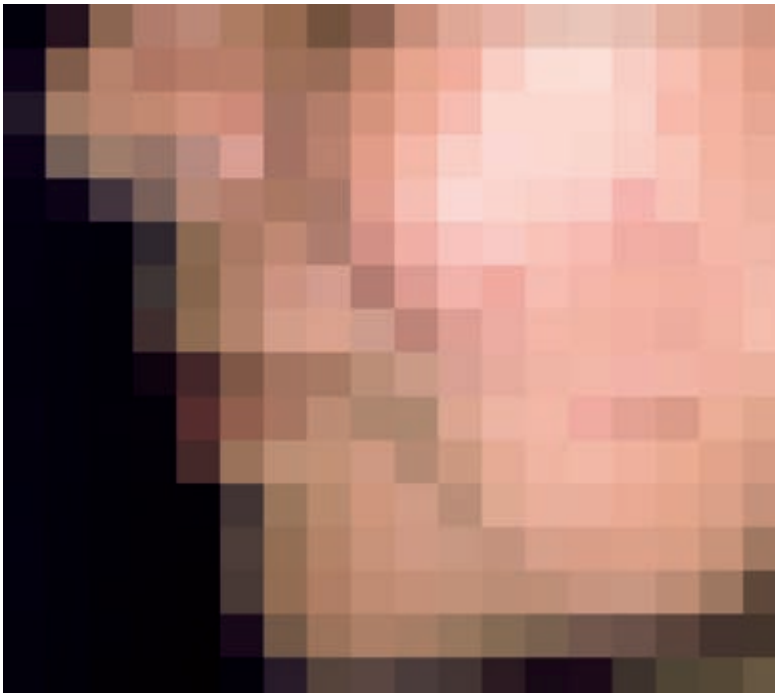

Figure 7. *Patient 1, post-treatment. Minimal scars are seen, without pigmentation changes.*

topical tretinoin in various concentrations (0.025-0.05 percent) proved to be a non-invasive treatment resulting in parcial improvement by transepidermal elimination of the OC lesions.[17,18] Oral isotretinoin also showed a limited effect.[19] Different surgical techniques have been used to remove skin osteoma, including the "microincision" technique (with needle or scalpel) and subsequent curettage, and escision preceded by dermabrasion.[19,20-22] Treatments with erbium:YAG laser have also been described, with excellent cosmetic results;[23,24] these authors highlight the ablative properties of this laser, which may cause less thermal injury than CO_2 laser. The work of Baginski et al. (on which we based our work) describes OC treatment with CO_2 laser assisted by curettage with results similar to ours, although they mention residual hypopigmentation not observed in our patients.[7]

We conclude that CO_2 laser therapy may become the treatment of choice for this condition of difficult therapeutic approach.

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