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# Osteoma cutis – Neoplasia or Paleogenetics?

**Penev Julian[1*], Ivan Krasnaliev[2], Ilko Bakardzhiev[3]**

[1]*Department of Infection Diseases, and Dermatology, Medical University of Varna, Bulgaria*

[2]*Department of General and Clinical Pathology, Forensic Medicine, and Deontology, Medical University of Varna, Bulgaria*

[3]*Medical College, Medical Univerity of Varna, Bulgaria*

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***Corresponding author:** Julian Penev, MD, Associate Professor, Department of Infection Diseases, and Dermatology, Medical University of Varna, Bulgaria, Tel:+3598888781833; E-mail: penevlaser@gmail.com*

## Abstract

Osteoma cutis, also called multiple miliary osteoma cutis is a rarely described dermatosis, and in cases that are not associated with Albright's hereditary osteodystrophy, osteoma cutis is being defined as a skin type of hamartoma, with mesenchymal cell differentiation in bone tissue. Levels of biochemical parameters (such as serum calcium, alkaline phosphatase and parathormones) are usually within the reference range when dermal osteomas are found. When osteoma cutis formations are X-ray detected (as it often happens when a computer tomography for dental purposes is performed) they manifest as small nodules in the skin with bone density ranging from 1 to 3mm. The very few presence in literature of osteoma cutis cases is due to the fact that the condition is usually asymptomatic and/or its scarce expression is misdiagnosed as milia, fatty hyperplasia or fatty cysts. Reported in this paper are 14 (fourteen) cases of osteoma cutis. It is discussed their occurrence is due to chronic inflammatory processes (acne), and/or pathogenic behavior of skin injuring (patomimia) that unlock suppressed genes (paleo genes) to protect the skin, that are similar to the bone tiles (osteoderms) present in many vertebrates.

**Key words:** osteoma cutis; multiple miliary osteoma cutis; CO2 laser ablation; osteoderms;

## Abbreviations

[CO2] – Carbon Dioxide

## Introduction

To our knowledge, relatively few cases of this particular dermatosis are being discussed in literature. According to some authors, 23 cases of osteoma cutis have so far been reported in English literature [1]. Other authors inform on 35 cases of osteoma cutis found in 20,000 consecutive skin biopsies [2]. It is known, that multiple miliary osteoma cutis is generally considered as an uncommon condition [3], a rare benign disorder [4], and miliary osteoma cutis is characterized by multiple bone formations that occur predominantly on face, and in women [8]. Our practice, however has proven osteoma cutis is not that uncommon, and is often present also on the shoulder and back area. We have accidentally come across osteoma cutis while conducting routine laser removal procedures (deep fatty cysts, and milia, etc.), (Figure 1) thanks to a purely physical process which actually serves as a truly reliable osteoma cutis instant diagnostic criteria: the ablation process stops as the laser beam reaches the bone structure, and a bright, white, sparkling light within the ablative channel is being observed. This is due to the fact that calcium structure is slightly thermally-conductive and thermally-resistant, and its point of contact with the infrared laser beam is heated to a temperature exceeding 3000 Co. There is light radiation from the heated body. Quite interestingly, the

**Figure 1:** Osteoma cutis

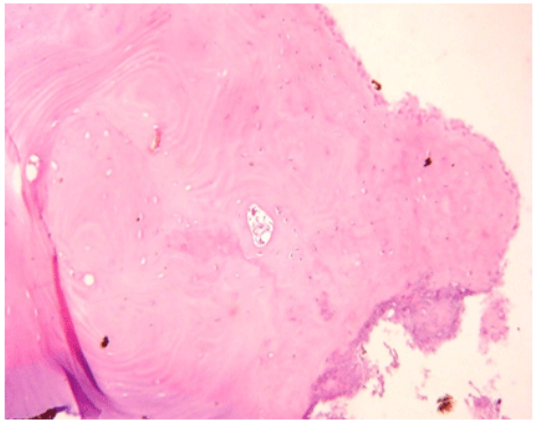

**Figure 2:** Histological view of osteoma cutis

development of quantum physics began with Max Planck's pioneering insight of radiation law [5], namely describing the radiation of light from a heated blackbody [6]. LASER itself is a quantum physics creation. With the presence of foreign bodies of mineral non-metallic matter (glass, porcelain, sand, slag) in the skin a similar laser induced light illumination can be observed. Skin Biopsy of extirpated osteomas were taken after initial osteoma cutis cases were observed. Results demonstrated Haversian canals, well-organized adult bone, as well as scarce osteocytes, and osteoblasts [Figure 2].

## Clinical cases and laser treatment methods of osteoma cutis

Reported are 14 (fourteen) cases of osteoma cutis - 12 females and 2 males, with age ranging between 40 - 65 years. *Osteoma cutis* formations were all unintentionally found in the course of utpatient CO2 laser treatments over a three-year period. In all 14 cases, osteoma cutis were accidentally detected during the processes of laser removal of facial fatty cysts, as in general several to ten bone formations were observed. However, the formations extirpated from the shoulders and back of a 42 old male patient were over 100 (Figure 3 and Figure 4).

**Figure 3:** Osteoma cutis found on shoulder area


**Figure 4:** Extirpated osteomas from the patient's shoulder area. Dark spots in the formations' center are result of laser carbonization on the surface of the structure

All 14 patients diagnosed with osteoma cutis were thoroughly questioned regarding previous dermatological symptoms, as well as other conditions that might be associated with occurrence of such formations. Generally, in all cases, there were either issues with acne in the past, or a persistent acne tarda. In some cases, patients reported a daily, similar to auto-aggression behavior of obsessive squeezing of pimples and comedones. The male patient with multiple osteoma on his shoulders reported on constant comedone squeezement actions performed on his shoulders area by his girlfriend. Osteoma cutis are found on the face and shoulders where no hairs are present. All osteoma cutis were easily removed using a simple, proprietary CO2 laser technique, different from a needle microincision–extirpation methodology described by other authors [7], erbium: YAG laser procedures [8], and surgical removal of discussed formations.

**It does consist of the following 4 steps:**

1. A small ablative hole with a maximum thin laser beam is done into the nodule center until a brief bright light observed.

**Figure 5:** Dermoscopic view (X100) of extirpated osteoma cutis. Laser beam's carbonation zone (the dark spot) is clearly seen.

**Figure 6:** Comedone extracting tool

2. The laser hole is being cut in the direction of Langer's lines orientation, with a length slightly less than the expected length of the osteoma.
3. Then, either performing a slight finger pressure or a comedone extracting tool (Figure 6) is used on the side of the cut until the osteoma pops out. It is easily done since osteoma cutis formations do not conglutinate with the surrounding dermal tissue.
4. The wound (2-3 mm) can be treated with a topical powder antibiotic, yet even if left untreated the wound epithelializes quickly with no visible scarring, as transient erythema persists for few weeks.

## Discussion

This well-organized and differentiated tissue can not be defined as a neoplastic (senso stricto) process since lesion cellular structures are result of differentiation and control, and not a neoplastic or metaplastic uncontrolled growth of mutated cell line. Etiology of osteoma cutis has so far been described as idiopathic. The presence of skin bone in all classes of vertebrate organisms is not uncommon, and is being explained with evolutionary defence mechanisms protecting the skin from injury [9], Bone tiles in fish, some fossil amphibians, dinosaurs, reptilians represent a similar histologically well-organized bone structure that is species genetically determined, and called "osteoderms" in biology, as well as in paleontology. In cladistics of birds and mammals (except for the Cingulata order), defencive osteoderms are not observed. Most likely, this is due to the replacement of these defence functions by the development of keratin structures - feathers in birds and hairs in mammals. A representative of reptiles - Heloderma horidum has multiple bone formations (osteoderms) in its skin. They serve to protect its skin from cacti thorns, which are part of the habitat. (Figure 7). It is assumed that even in Armadillos the presence of dermal bone structures also serves to protect against the cacti thorns. Crocodile leather goods (boots, suitcases) unless a replica, are osteoma abundant, and are X-ray image observed in airport security inspections.

**Figure 7:** Heloderma horridum and Dasypus novemcinctus- typical representatives of species with well developed skin osteoderms

## Conclusion

Osteoderms in Vertebrates are histologically identical to human Osteoma cutis formations. It is likely that skin osteoma genes were not lost in evolutionary terms but suppressed, and locked in the genome. Chronic inflammation and pathogenic auto-aggression are likely to trigger those locked protective palleogens in the undifferenciated mesenchymal cells. With the increasingly frequent use of laser ablative and non-ablative fractionated rejuvenation procedures, mesotherapeutic pricks, and dermal rollers, the onset of protective dermal osteogenesis may be observed in the future, although such are not so far reported.

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