Titanium allergy: could it affect dental implant integration?

Siddiqi A, Payne AG, De Silva RK, Duncan WJ.


Oral Implantology Research Group, Sir John Walsh Research Institute, School of Dentistry, University of Otago, Dunedin, New Zealand.

Abstract

Purpose: Degradation products of metallic biomaterials including titanium may result in metal hypersensitivity reaction. Hypersensitivity to biomaterials is often described in terms of vague pain, skin rashes, fatigue and malaise and in some cases implant loss. Recently, titanium hypersensitivity has been suggested as one of the factors responsible for implant failure. Although titanium hypersensitivity is a growing concern, epidemiological data on incidence of titanium-related allergic reactions are still lacking. Materials and methods: A computer search of electronic databases primarily MEDLINE and PUBMED was performed with the following key words: 'titanium hypersensitivity', 'titanium allergy', 'titanium release' without any language restriction. Manual searches of the bibliographies of all the retrieved articles were also performed. In addition, a complementary hand search was also conducted to identify recent articles and case reports. Results: Most of the literature comprised case reports and prospective in vivo/in vitro trials. One hundred and twenty-seven publications were selected for full text reading. The bulk of the literature originated from the orthopaedic discipline, reporting wear debris following knee/hip arthroplasties. The rest comprised osteosynthesis (plates/screws), oral implant/dental materials, dermatology/cardiac-pacemaker, pathology/cancer, biomaterials and general reports. Conclusion: This review of the literature indicates that titanium can induce hypersensitivity in susceptible patients and could play a critical role in implant failure. Furthermore, this review supports the need for long-term clinical and radiographic follow-up of all implant patients who are sensitive to metals. At present, we know little about titanium hypersensitivity, but it cannot be excluded as a reason for implant failure.
Hypersensitivity to titanium osteosynthesis with impaired fracture healing, eczema, and T-cell hyperresponsiveness in vitro: case report and review of the literature.

Thomas P, Bandl WD, Maier S, Summer B, Przybilla B.


Klinik und Poliklinik für Dermatologie und Allergologie der Ludwig-Maximilians-Universität, München, Germany. peter.thomas@med.uni-muenchen.de

Abstract

There are very few reports on hypersensitivity reactions in association with titanium-based materials so that the existence of allergy to titanium is still put in question. We report on a patient in whom impaired fracture healing and eczema localized to the perioperative area developed upon titanium-based osteosynthesis. Patch testing gave no reactions to titanium nor to nickel, chromium, or cobalt. However, in the lymphocyte transformation test, the patient's lymphocytes showed markedly enhanced proliferation in vitro to titanium. After removal of the titanium material, fracture healing was achieved and the eczema cleared. Parallel to this, in vitro hyperreactivity to titanium disappeared. Although contact allergic reactions to titanium have been very rarely reported, these findings support a diagnosis of titanium allergy in our patient.

Allergologische Diagnostik bei Verdacht auf Implantatunverträglichkeit: Hinweise für die Praxis

Eine Stellungnahme der Deutschen Kontaktallergie-Gruppe (DKG)

Geier J, Lessmann H, Becker D, Thomas P

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Kein Abstract
Titanium allergy in dental implant patients: a clinical study on 1500 consecutive patients.


Clinica Sicilia, Oviedo, Spain. asicilia@clinicasicilia.com

Comment in:


Abstract

BACKGROUND: In dentistry, allergic reactions to Ti implants have not been studied, nor considered by professionals. Placing permanent metal dental implants in allergic patients can provoke type IV or I reactions. Several symptoms have been described, from skin rashes and implant failure, to non-specific immune suppression.

OBJECTIVE: Our objective was to evaluate the presence of titanium allergy by the anamnesis and examination of patients, together with the selective use of cutaneous and epicutaneous testing, in patients treated with or intending to receive dental implants of such material.

MATERIAL AND METHODS: Thirty-five subjects out of 1500 implant patients treated and/or examined (2002-2004) were selected for Ti allergy analysis. Sixteen presented allergic symptoms after implant placement or unexplained implant failures [allergy compatible response group (ACRG)], while 19 had a history of other allergies, or were heavily Ti exposed during implant surgeries or had explained implant failures [predisposing factors group (PFG)]. Thirty-five controls were randomly selected (CG) in the Allergy Centre. Cutaneous and epicutaneous tests were carried out.

RESULTS: Nine out of the 1500 patients displayed positive (+) reactions to Ti allergy tests (0.6%): eight in the ACRG (50%), one in the PFG (5.3%)(P=0.009) and zero in the control group. Five positives were unexplained implant failures (five out of eight).

CONCLUSIONS: Ti allergy can be detected in dental implant patients, even though its estimated prevalence is low (0.6%). A significantly higher risk of positive allergic reaction was found in patients showing post-op allergy compatible response (ACRG), in which cases allergy tests could be recommended.
Suspected association of an allergic reaction with titanium dental implants: a clinical report.

Egusa H, Ko N, Shimazu T, Yatani H.


Department of Fixed Prosthodontics, Osaka University Graduate School of Dentistry, Osaka, Japan.

Abstract

Recent reports have questioned whether metal sensitivity may occur after exposure to titanium. This clinical report demonstrates the emergence of facial eczema in association with a titanium dental implant placed for a mandibular overdenture supported by 2 implants. Complete remission was achieved by the removal of the titanium material. This clinical report raises the possibility that in rare circumstances, for some patients, the use of titanium dental implants may induce an allergic reaction.

Implantatallergien

Thomas P, Thomsen M.


Klinik und Poliklinik für Dermatologie und Allergologie, Ludwig-Maximilians-Universität München, Frauenlobstr. 9-11, 80337, München. Peter.Thomas@med.uni-muenchen.de

Abstract

Tissue reaction involving an intraoral skin graft and CP titanium abutments: a clinical report.

Mitchell DL, Synnott SA, VanDercreek JA.


Prosthodontics Department, National Naval Dental Center, Bethesda, Maryland.

Abstract

Focal areas of gingival hyperplasia surrounding the transmucosal portions of titanium implants have been attributed to poor hygiene, lack of attached gingival tissues, and titanium allergy. Following mandibular vestibuloplasty and placement of a split-thickness skin graft, two of five patients developed persistent proliferation of the epithelial tissue surrounding endosseous CP titanium dental implants. In both circumstances, traditional gingivectomy procedures, chemotherapeutic agents, and aggressive oral hygiene measures failed to adequately control the hyperplastic response. Following replacement of the titanium abutments with custom-fabricated gold abutments, the epithelial condition appeared to return to normal.