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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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USE OF TANTALUM CUP IN TOTAL HIP ARTHROPLASTY-A NARRATIVE REVIEW

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Abstract.

Tantalum, known for its superior mechanical properties and biocompatibility, has revolutionized the field of acetabular reconstruction, especially in revision total hip arthroplasty (rTHA). This review explores the clinical indications, biomechanical and biological properties, benefits, risks, and outcomes associated with tantalum acetabular components, particularly in managing complex cases of acetabular deficiencies. Extensive research has highlighted tantalum's ability to promote osseointegration, provide high survivorship rates, and maintain mechanical stability even in the most challenging cases, such as pelvic discontinuity and severe bone loss. However, challenges remain, including high costs and the need for long-term studies in primary total hip arthroplasty (THA). This article aims to provide a comprehensive overview of tantalum's current role in THA, discussing the potential for broader applications in primary surgeries and the implications of its high cost on healthcare systems.

Key words. Tantalum, Revision Total Hip Arthroplasty (rTHA), Acetabular reconstruction.

Introduction.

Acetabular deficiencies present a significant challenge in total hip replacement (THR), particularly in revision surgeries where previous implants may have failed due to bone loss or loosening. The choice of implant material is critical in ensuring long-term success, and tantalum has become increasingly popular due to its unique mechanical and biological properties. Traditionally, materials like titanium and cobalt-chromium have been used, but their limitations, especially in complex cases, have driven interest in tantalum.

Tantalum, a transition metal with a high melting point and excellent corrosion resistance, has found its niche in orthopaedic applications due to its highly porous structure, which closely mimics trabecular bone. Its use in acetabular reconstruction, particularly in cases involving extensive bone loss, pelvic discontinuity, and revision surgeries, has garnered significant attention. The purpose of this review is to analyze the role of tantalum in managing acetabular deficiencies, examining its clinical indications, benefits, risks, and long-term outcomes [1].

Indications for Tantalum in Acetabular Reconstruction. Tantalum is particularly indicated in revision total hip arthroplasty (rTHA), where patients present with severe acetabular deficiencies, often due to previous failed implants. Specific indications for its use include:

Aseptic Loosening: Aseptic loosening is one of the most common causes of implant failure, and tantalum's mechanical stability makes it a preferred choice in revision surgeries addressing this issue. In cases of failed acetabular components, tantalum offers a reliable solution by providing structural support and promoting bone ingrowth [2].

Pelvic Discontinuity: Tantalum has demonstrated superior outcomes in cases of pelvic discontinuity, where the pelvic bone is fractured or discontinuous. The material's high porosity allows for rapid bone ingrowth, and its mechanical properties provide the necessary support to bridge the defect [3].

Osteonecrosis and Rheumatoid Arthritis: In conditions such as osteonecrosis and rheumatoid arthritis, where bone quality is compromised, tantalum offers enhanced fixation and stability. These systemic conditions often lead to poor bone stock, making tantalum's ability to promote osseointegration critical for long-term implant success [4].

Revision of Failed Implants: Tantalum is also indicated in cases where previous implants have failed due to wear, infection, or mechanical loosening. Its adaptability, particularly in combination with augments and cages, makes it an ideal choice for complex revisions [5].

Biomechanical and Biological Properties of Tantalum.

Tantalum's biomechanical properties make it uniquely suited for orthopaedic applications. Its porous structure, with approximately 80% porosity, closely resembles trabecular bone, which allows for enhanced osseointegration and mechanical interlocking. This high level of porosity promotes rapid and sustained bone ingrowth, ensuring long-term stability of the implant, even in cases of poor bone quality. Studies have shown that tantalum's ability to integrate with host bone is superior to that of titanium and cobalt-chromium, leading to better long-term outcomes in both primary and revision surgeries [6].

Tantalum's elastic modulus, which measures the stiffness of a material, is closer to that of natural bone compared to other materials commonly used in THA. This similarity helps reduce stress shielding, a phenomenon where the stiffness of the implant causes the surrounding bone to weaken. In contrast, materials like titanium are stiffer, leading to more pronounced bone loss around the implant over time. By minimizing stress shielding, tantalum helps preserve bone stock, which is particularly important in revision surgeries [6,7].

In addition to its mechanical properties, tantalum is highly biocompatible and resistant to corrosion. These characteristics reduce the risk of implant rejection and inflammation, which can complicate surgeries using other materials. Its ability to resist fatigue and wear over time further supports its use in weight-bearing joints like the hip, where mechanical stresses are high [8].

Benefits of Tantalum Acetabular Components.

Enhanced Osseointegration and Stability: One of the most significant benefits of tantalum is its ability to promote

osseointegration. The material's high porosity allows for rapid bone ingrowth, which leads to early and sustained stability of the implant. This is especially critical in revision surgeries, where bone quality is often compromised. Clinical studies have shown that tantalum outperforms other materials in terms of implant fixation, leading to better long-term outcome [9].

High Survivorship Rates: Long-term studies have demonstrated that tantalum acetabular components achieve high survivorship rates, with reports of more than 90% survival over 10-15 years. This makes tantalum particularly useful in revision surgeries, where the risk of implant failure is higher due to poor bone stock or previous complications [10].

Resistance to Infection: Infection is a significant concern in revision THA, where the risk of infection is higher than in primary procedures. Some studies suggest that tantalum's porous structure may reduce the risk of bacterial colonization, offering an additional layer of protection against infection. This property, combined with its biocompatibility, makes tantalum an attractive option in revision surgeries, where infection is a leading cause of implant failure [11,12].

Versatility in Complex Cases: Tantalum's adaptability, particularly when combined with augments and cages, makes it highly versatile in treating complex acetabular defects. Studies have shown that tantalum components, when used with augments, restore acetabular integrity and improve outcomes in cases of severe bone loss and pelvic discontinuity [13].

Disadvantages Associated with Tantalum in THA.

High Cost: One of the primary limitations of tantalum is its cost, which is significantly higher than that of other materials like titanium. While tantalum offers superior outcomes, its higher cost may limit its widespread adoption, particularly in healthcare systems with budget constraints. The economic implications of using tantalum in revision THA need to be carefully considered, especially in light of its high upfront cost compared to other materials [14].

Re-revision Risks: Despite tantalum's excellent performance in revision THA, the risk of re-revision due to mechanical failure or infection remains. Although less common than with other materials, cases of re-revision have been reported, particularly in instances of persistent infection or component loosening. Studies suggest that while tantalum reduces the risk of failure, it does not eliminate it entirely [12].

Limited Long-term Data in Primary THA: While tantalum has been extensively studied in revision THA, long-term data on its use in primary THA are still limited. Although tantalum has shown promise in younger patients with dysplasia or poor bone quality, more research is needed to establish its efficacy and safety in primary procedures over the long term [15].

Discussion.

The adoption of tantalum in managing acetabular deficiencies represents a significant advancement in revision total hip arthroplasty (rTHA). Numerous studies have underscored its unique biomechanical properties, such as high porosity and lower elastic modulus, which offer several advantages over traditional materials like titanium and cobalt-chromium alloys. Tantalum's closer match to the mechanical properties of human bone allows for better load distribution, reducing stress shielding and preserving bone stock in the long term. This feature is especially important in revision surgeries where bone loss and poor quality are major concerns [16].

A key aspect of tantalum's success lies in its ability to facilitate osseointegration, a process where bone grows into the porous structure of the implant, creating a stable interface that ensures long-term fixation. Compared to other materials, tantalum's high porosity—up to 80%—mimics trabecular bone, enhancing bone ingrowth and improving implant stability. This makes tantalum particularly effective in revision surgeries, where bone regeneration is crucial. Studies suggest that osseointegration with tantalum implants occurs faster and is more robust than with traditional titanium implants [17].

Another notable advantage of tantalum in acetabular reconstruction is its resistance to infection. Given that infection is a leading cause of failure in revision THA, any material that can minimize this risk is highly valuable. Tantalum's porous structure may inhibit bacterial colonization, which is thought to reduce the incidence of postoperative infections. Although more research is required to definitively prove this benefit, preliminary data are promising, and infection resistance is a notable point in favour of tantalum over other materials [12].

Tantalum's utility is particularly evident in cases of pelvic discontinuity, where the challenge of restoring pelvic integrity is compounded by the need for a mechanically stable implant that can promote bone healing. Tantalum's adaptability, especially when used in conjunction with augments, makes it a preferred material for managing such defects. Studies have shown that tantalum components, when combined with augments, significantly improve patient outcomes in cases of severe bone loss and pelvic discontinuity. In such scenarios, tantalum implants not only restore the structural integrity of the pelvis but also encourage bone healing due to their porous architecture [18,19].

In comparison to titanium, which has long been the gold standard in THA, tantalum offers several biomechanical advantages that make it more suitable for use in patients with complex acetabular defects. For instance, tantalum has a lower elastic modulus than titanium, which means it more closely matches the mechanical properties of natural bone. This reduces the risk of stress shielding—a phenomenon where the implant takes on too much load, causing the surrounding bone to weaken over time. By reducing stress shielding, tantalum implants help preserve bone stock, which is especially important in younger patients or those undergoing revision surgery [15].

Despite its numerous benefits, the widespread adoption of tantalum in acetabular reconstruction is not without challenges. The high cost of tantalum implants is a significant barrier to their more widespread use. In healthcare systems with budget constraints, the decision to use tantalum must be weighed carefully against the potential long-term benefits it offers. While tantalum's mechanical properties and infection resistance may justify its higher cost in revision surgeries, its role in primary THA, where the clinical benefits may not be as immediately apparent, remains a subject of debate. Several studies suggest that tantalum's superior long-term performance may offset

its higher initial cost, particularly in revision surgeries where the risk of implant failure is higher. However, more research is needed to fully assess the cost-effectiveness of tantalum, particularly in comparison to other materials like titanium [20].

Conclusion.

Tantalum acetabular components have demonstrated exceptional performance in managing acetabular deficiencies, particularly in revision THA where patients present with severe bone loss or pelvic discontinuity. Tantalum's unique combination of biomechanical properties, including its high porosity, biocompatibility, and ability to promote osseointegration, make it an ideal material for use in complex cases. Clinical studies have shown that tantalum provides superior long-term stability, higher survivorship rates, and potential resistance to infection compared to traditional materials like titanium.

However, the high cost of tantalum implants remains a significant barrier to their widespread use. While tantalum offers clear benefits in revision surgeries, where the risk of implant failure is higher, its role in primary THA is still being explored. The limited long-term data on tantalum in primary procedures raises questions about its broader application in younger, more active patients who may require revision surgery later in life. As more data become available, tantalum's cost-effectiveness and its role in primary THA will need to be carefully evaluated.

In conclusion, tantalum remains a valuable option in acetabular reconstruction, particularly in revision THA where its benefits clearly outweigh its higher cost. Future research should focus on expanding the long-term data available on tantalum in primary THA and further exploring its potential to reduce the incidence of postoperative infections. Additionally, efforts should be made to reduce the cost of tantalum implants to make this highly effective material more accessible to a broader range of patients.

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