

## Avoid the Possibility of Remove of Osteosynthesis Device Secondary to Infection of the Lumbar Region

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### ABSTRACT

*Infections after spinal surgery are one of the battles and a cause for concern for any spinal surgeon. For its prevention, it is necessary to control the previous situation of the patients, strict prophylaxis protocols in the operating room and mechanisms for early detection of infection.*

*Acting at these three levels will allow us to reduce the rate of post-surgical spine infections and avoid new interventions and more suffering for our patients.*

*We present the use of a product that tries to avoid the need to remove the implant in the event of a wound infection.*

### Keywords

D.A.C., Wound infection, Spinal Lumbar Surgery, Lumbar arthrodesis.

### Introduction

The risk of infection after the implantation of a first joint prosthesis, in healthy patients, has been established around 1-3%. This can be much higher (>15-20%) in patients with certain underlying diseases (diabetes, rheumatoid arthritis, previous infections, etc.) or in patients undergoing prosthesis replacement.

Infection is considered to be the leading cause of knee replacement failure (25% of knee replacement failures are due to infection) and the third leading cause of hip replacement failure (15% of knee replacement failures). A hip replacement is due to infection.

In other joints, such as the shoulder or ankle, the figures can be much higher. Post-surgical infection is an infection that appears in the first 30 days after the intervention. Spinal infection causes pain, loss of appetite, fever and wound suppuration.

It is necessary to distinguish the post-surgical infection that occurs in the first 30 days from the possibility that a later infection, for example from the throat, passes into the blood and ends up infecting the previous spinal surgery.

Infections that occur after back surgery can be superficial if they affect the skin and the most superficial layers of the subcutaneous tissue. When the infection affects fasciae and muscular planes, we are facing a deep infection.

Infection that is based on the ability of certain bacteria to adhere to the surface of the prosthesis, multiply and form a structure called biofilm. The infection occurs after the arrival of pathogens (bacteria) to the implant and this takes place, in most cases, during the surgical procedure; less frequently it occurs via the bloodstream from remote sources of infection (hematogenous prosthetic infection).

The infection of a prosthesis is never due to "rejection of the prosthesis", as we frequently hear our patients say, and it is not caused by an "operating room virus", since in 99% of cases, the

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infection is bacterial. The existence of said biofilm is responsible for device infection being a difficult entity to diagnose and treat.

There are a series of factors to take into account in relation to the possible infection of the implant in the lumbar region:

### Age

Unfortunately, we cannot influence this factor. Patients older than 70 years are more at risk of having an infection. It seems that the risk of infection is more related to associate pathologies than to age itself. That is to say, the previous state of health influences more than the age itself.

### Associated Diseases

Diabetes, chronic obstructive disease, coronary disease, rheumatic diseases favor that we have an infection after spinal surgery.

### Diabetes

Being diabetic is a risk factor for infection after spinal surgery. The latest studies tell us that it is not really the fact of being diabetic that increases the risk of infection, but rather having poorly controlled blood glucose levels. It is very important to keep the glucose figures adjusted the months before a spinal intervention.

### Nutritional Condition

Patients with anemia or nutritional syndromes are at increased risk of postoperative infection. It is very important to have the correct blood albumin values.

Hypoalbuminemia is related to impaired wound healing, which increases the risk of infection.

### Tobacco

Nicotine prevents blood from reaching the operated back area properly. Without a correct supply of oxygen and nutrients, the possibility that our back operation will be complicated increases.

### Obesity

Patients with a body mass index greater than 35 are at increased risk of infection. It also influences how the body fat is distributed, the distance between the skin and the bone also influences, and each millimeter of subcutaneous fat increases the risk of suffering an infection by 6%. Likewise, we also have to take into account a series of considerations in relation to the surgery of the Lumbar region.

A) Duration of the surgery. The longer a back surgery is in progress, the more likely you are to get an infection. To minimize the risk of infection, it is important to frequently irrigate the wound with serum. It is also important to use antibiotic prophylaxis and repeat an antibiotic dose at 4h or when blood loss is greater than 1L.

B) Type of surgery the more aggressive an intervention, the greater the risk of suffering a post-surgical infection.

**1. Micro Discectomy:** Discectomy is the least aggressive surgical technique in spine surgery. The infection rate for this intervention is around 1-2.5%. The appearance of endoscopic technology for the treatment of herniated discs has practically reduced the risk of

**2. Urinary Infection:** In longer surgeries, it is necessary to catheterize patients. The fact of being catheterized increases the risk of suffering a urine infection and this can contaminate the surgical wound. On the other hand, 30% of women suffer from subclinical infections (we have a urine infection without symptoms) so it is advisable to perform a urinalysis if we are going to undergo back surgery.

The most effective treatment to avoid back infections is prevention. You must control blood glucose levels, review nutritional status, and urine infection, these are relatively simple things that we can do if we are going to undergo surgery.

In the event that the surgery performed is a spinal fusion, early detection of infection is essential. An uncontrolled infection in time can completely fail the result of the surgery. For this reason, in these cases we must be more aggressive and perform a cleaning surgical intervention to wash the wound and eliminate all the infected tissue. The failure rate of surgery with screws after an infection is close to 25% and can cause us to have to remove the material, cure the infection with antibiotics for a few months and perform a new intervention.

### Material & Methods

We have performed spinal surgery for the first time using a product that would allow, in case of infection of the wound, not allowing said infection to affect the surgical implant. This is possible by performing, as seen in Figures 1 & 2 & 3, the use of the D.A.C in the screw, bar and washer.

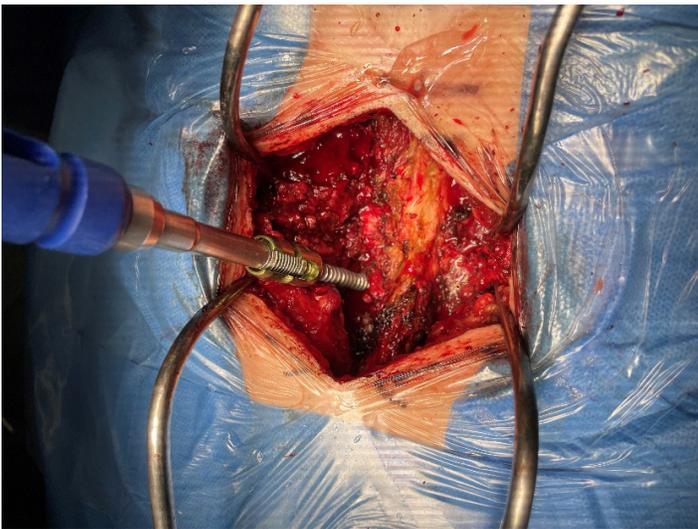


**Figure 1:** D.A.C screw

At this time, said patient has a 3-month follow-up without presenting any signs or symptoms that suggest the appearance of an infection of the surgical wound.



**Figure 2:** D.A.C Rod



**Figure 3:** D.A.C. screw in surgery

For us, this product would be of mandatory use in Diabetics, Obese and immunodipressed whose index of possibility of infection is higher than the rest of patients.

### Discussion

Surgical wound infection is a rare complication but one that carries significant morbidity and mortality, prolonged hospital stays, patient suffering and increased health care costs. Infections caused by multiresistant bacteria have increased in the last decade [1].

These infections imply great difficulty in medical-surgical treatment and an epidemiological problem at the hospital level [2].

Surgical wound infection in spinal surgery is a serious but rare complication. Its incidence is greater, in those surgeries associated with instrumentation, between 2.1 and 8.5% [3].

In a study published by Abdul-Jabbar et al., approximately 70%

are caused by gram-positive bacteria, mainly *Staphylococcus aureus* (45.2%), followed by coagulase-negative *Staphylococcus* (31.4%) [4].

The percentage of resistance to methicillin is 34.3%. Gram-negative bacteria are responsible for 30.5% of cases. Lumbar and sacral spine surgeries are more frequently associated with polymicrobial infections or infections caused by gram-negative microorganisms [5].

Infections that start before 90 days are considered early and late, those that appear after 90 postoperative days.

In early infections, Mok and Cahill et al. recommend lavage and surgical debridement with retention of the implant followed by appropriate antibiotic treatment for 4-6 weeks until spinal fusion, with cure rates of 80% [6].

In late infections, removal of instrumentation is recommended when spinal fusion is achieved. On the other hand, in the last decade there has been an increase in infections caused by carbapenem-resistant *Enterobacteriaceae*, which entails an increase in morbidity and mortality and is a public health problem [7].

Treatment should be individualized according to sensitivity, source of infection and patient comorbidity.

### Conclusion

“Defensive Antibacterial Coating” has been specifically designed to protect from bacterial colonization and biofilm formation a wide variety of implantable biomaterials used in orthopaedics & traumatology and Neurosurgery (spine).

The biodegradable hydrogel is intended to serve as a temporary physical barrier against the bacterial adhesion and the formation of microbial biofilms.

The Hydrogel represents an additional measure of infection prevention, which is not intended to replace or to substitute the asepsis measures and the usual protocols of antibiotic prophylaxis recommended in our surgery.

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