Acta Orthop. Belg., 2022, **88**, 645-654

ORIGINAL STUDY

doi.org/ 10.52628/88.4.9722

Survey regarding prevention of surgical site infection after orthopaedic surgery in Belgium: are we on the right track?

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Prevention strategies are essential to reduce the rate of surgical site infection (SSI) in orthopaedic surgery. Members of the Royal Belgian Society for Orthopaedic Surgery and Traumatology (SORBCOT) and the Belgische Vereniging voor Orthopedie en Traumatologie (BVOT) were asked to answer a 28-question questionnaire on the internet about the application of surgical antimicrobial prophylaxis measures and to compare them with current international recommendations. 228 practicing orthopedic surgeons responded to the survey from different regions (Flanders, Wallonia and Brussels), different hospitals (university, public and private), different levels of experience (< 5 years, 5 to 10 years and > 10 years) and different subspecialties (lower limb, upper limb and spine). Regarding the questionnaire: 7% systematically perform a dental check-up. 47.8% of the participants never carry out a urinalysis, 41.7% when the patient presents symptoms and 10.5% carry it out systematically. 2.6% systematically propose a pre-operative nutritional assessment. 5.3% of respondents suggest stopping biotherapies (Remicade®, Humira®, rituximab®, etc.) before an operation and 43.9% do not feel comfortable with this type of treatment. 47.1% suggest smoking cessation before the operation and 22% of them advise smoking cessation for a period of 4 weeks. 54.8% never carry out MRSA screening. 68.3% systematically performed hair removal, 18.5% when the patient had hirsutism. Among them, 17.7% use shaving with razors. Alcoholic Isobetadine is the most used product with 69.3% when disinfecting the surgical site. 42.1% of the surgeons chose a delay between the injection of antibiotic prophylaxis and the incision of less than 30 minutes, 55.7% between 30 and 60 minutes and 2.2% between 60 and 120 minutes. However, 44.7% did not wait for the injection time to be respected before incising. An incise drape is used in 79.8% of cases. The response rate was not influenced by the surgeon's experience. Most international recommendations in terms of prevention of surgical site infection are correctly applied. However, some bad habits are maintained. These include the use of shaving for depilation and the use of non-impregnated adhesive drapes. Practices that could be improved include management of treatment in patients with rheumatic diseases, a 4-week smoking cessation period, and treating positive urine tests only when symptomatic.

Keywords: Surgical site infection; preventive measures; perioperative management for wound; national survey.

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No benefits or funds were received in support of this study.
None of the authors have a conflict of interest.

INTRODUCTION

In terms of morbidity and mortality, infections in orthopaedic surgery can be compared to cancer *(1)*. The 5-year mortality rate for patients with periprosthetic infection is higher than that of patients with breast cancer, melanoma, Hodgkin's lymphoma and testicular cancer, matched to the same age and comorbidities *(2)*. Infections have devastating consequences for the patient and remain a challenge in terms of socio-economic issues. They represent one of the most common complications in surgery. There is a strong correlation between superficial wound infections and the likelihood of developing a deep infection. Therefore, prevention of surgical site infection reduces the rate of deep wound infection.

The aim of this study is to find out the habits of Belgian orthopaedic surgeons in terms of prophylactic measures for surgical site infections (SSI). And to see if they are in line with national and international recommendations.

MATERIALS AND METHODS

A questionnaire with 28 multiple choice questions was sent to members of the Royal Belgian Society for Orthopaedic Surgery and Traumatology (SORBCOT) and the Belgische Vereniging voor Orthopedie en Traumatologie (BVOT) via the internet from 30 January 2021 until 23/03/2021 (Table I). This questionnaire targets the classical preoperative prophylactic measures used to reduce the risk of contamination of the surgical site. The questionnaire was conducted using Google Forms (URL: https://www. google.com/intl/en/forms). Participants were asked to respond on the basis of their daily practice in elective surgery, excluding day hospital surgery. Consent was considered implicit by answering the questionnaire. Participants were not informed about the existing guidelines before the survey but were informed about the purpose of the survey.

The results are expressed as a percentage of the total number of responses obtained for each selected question. The responses were analyzed using dynamic cross-tabulations in Excel. Statistical analysis was carried out using SPSS SigmaPlot V13 software. A chi-square test was performed (or Fischer's test if the number of responses was less than 5) to determine whether the proportions of responses to the questions were equal or not according to the category analyzed. Statistical significance was accepted at $p<0.05$.

RESULTS

With 96 participants from BVOT and 131 participants from SORBCOT, a total of 228 members responded to the questionnaire. Hospital type, regions, surgeon experience and subspecialty are represented in Table II.

The overall results are shown in Table III.

Dental check-up. 46.5% never perform it and 7% perform it systematically. 46.5% of the participants carry out a dental check-up if the patient has poor dental hygiene or if there is a known active infection in the oral cavity. Dental check-up is more frequently requested in university settings ($p = 0.013$) (Fig. 1).

Urinalysis. Regarding pre-operative urinalysis, 47.8% of the participants never perform it, 41.7% when the patient presents symptoms and 10.5% perform it systematically. Of the 47.8% who do it systematically, 68% treat asymptomatic bacteriuria and 32% only if they also have symptoms.

Nutritional assessment. 53.7% do not offer any pre-operative nutritional management, this is even more true in Wallonia compared to Flanders and Brussels (68.8% vs. 46.1% vs. 42.0%) ($p = 0.017$) (Fig. 2).

Biotherapies. Biotherapies seem to be very poorly understood by orthopaedic surgeons as only 5.3% suggest stopping biotherapies preoperatively and 43.9% of respondents are not comfortable with this treatment. There were no significant differences between the different levels of experience and between the different regions.

Smoking cessation. 47.1% of the participants recommend the patient to consider quitting smoking in the pre-operative period and 36.6% to at least reduce consumption. However, of the 47.1%, only 22% proposed a 4-week smoking cessation period. There were no significant differences between level of experience, region and subspecialty.

Table I. — Summary of questions

I. In which region do you practice your activity?	- Brussels - Flanders - Wallonia
2. In which type of hospital do you practice?	- Private - Public - University
3. Which anatomical region is your preferred activity?	- Upper limb - Lower limb - Spine
4. How long have you been practising?	- < 5 years - 5 to 10 years - > 10 years
5. When do you perform the pre-operative dental check-up?	- Systematically - If poor dental hygiene - If a dental focus is found - Never
6. When do you do a pre-operative urinalysis?	- Systematically - When the patient presents urinary symptoms - Never
7. Do you treat bacteriuria?	- Systematically - Only if positive
8. Do you test for nasal carriage of S. Aureus pre-operatively?	- Systematically, if no recent results - Only if the patient has other risk factors for postoperative infection (smoking, obesity, diabetes...) - Never
9. Do you request the suspension of biotherapies (Remicade®, Humira®, rituximab …) or DMARDs (methotrexate ...) prior to surgery?	- Systematically - Only biotherapies - Only DMARDs - I don't feel comfortable enough with this type of treatment to make a decision - Never
10. Do you recommend quitting smoking before the procedure?	- Systematically - I recommend reducing consumption - Never
11. What is the time limit from which you ask to stop smoking?	- From the pre-operative consultation - 4 weeks before the operation - 10 days before the operation - As soon as the patient feels able
12. Do you offer peri-operative nutritional/endocrinological management?	- Systematically - Only if risk factors (obesity, undernutrition, diabetes, ...) - Never
13. How many pre-operative showers do you require (excluding trauma)?	- 1 shower - 2 showers - No showers
14. What product do you usually use for the pre-operative shower(s)?	- Mild soap - Betadine - Chlorhexidine
15. When do your patients shower?	- Most often on the same day - Most often the day before the operation
16. Do you remove the hair before operation?	- Systematically, the entire limb - Systematically, the operative area - If the patient has hirsutism, the operative area - Never
17. When do you have your patients depilated?	- Mostly the day before - Mostly the same day

18. Which method do you use?	- Clippers - Shaving - Depilatory cream
19. What are your practices in terms of pre-operative hand washing?	- Foaming solution alone before each operation - Foaming solution + hydro-alcoholic solution before each operation - Foaming solution + hydro-alcoholic solution at the beginning of the programme then hydro-alcoholic solution alone at each operation
20. Antibiotic prophylaxis, does the delay matter?	- Yes - No
21. What is the ideal time between the injection of the classic antibiotic prophylaxis (excluding allergies) and the incision?	- < 30 minutes - Between 30 and 60 minutes - > 60 minutes - > 120 minutes - After incision
22. Do you specify the nature of the antibiotic prophylaxis used before incision?	- Yes - No
23. Do you specify the time of the antibiotic prophylaxis injection before incision?	- Yes - No
24. Once the antibiotic prophylaxis has been injected do you respect the delay before incising?	- Yes - No
25. What product do you use to disinfect the surgical site (excluding traumatology)?	- Isobetadine aqueous - Alcoholic isobetadine - Chlorhexidine 0.5 - Chlorhexidine 2%
26. Do you use an incise drape during the procedure?	- In general, an impregnated drape - Usually an unimpregnated drape - Generally, never
27. What do you think has the greatest impact on the occurrence of a surgical site infection?	- The number of persons in the operating room - The movement of each person in the operating room
28. In your opinion, do social interactions (jokes between colleagues, discussions out of context, music, etc.) have an impact on surgical site infection?	- Yes - No

When do you perform the pre-operative dental check-up	Private	Public	Univers
Never	46,5	51,6	
Active infection in oral cavity	32,4	13,7	
Poor dental hygiene	18,3	28,4	
Systematically	2,8	6,3	

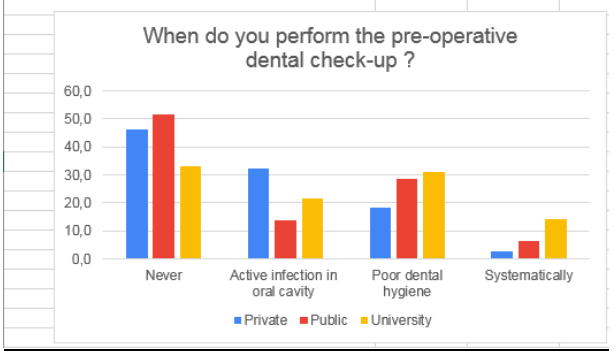

Fig. 1. — Dental check-up according to the type of hospital

Nutritional support	BRUSSELS	FLANDERS	WALLONIA
Never	42,0	46,1	68,8
Only if risk factors (obesity, undernutrition, diabetes, etc.)	52,0	51,7	28,6
Systematically	4,0	2,2	2,6

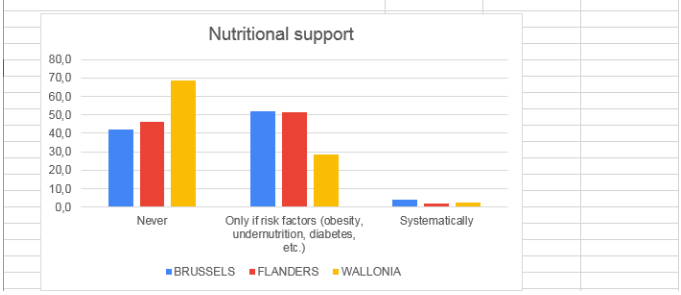

Fig. 2. — Nutritional support according to region

Table II. — Demography

REGION	Brussels 59/228 (25,9%)	Flanders 92/228 (40,4%)	Wallonia 88/228 (38,6%)
SCIENTIFIC SOCIETY	SORBCOT 131/228 (57,7%)	BVOT 96/228 (42,3%)	
HOSPITAL TYPE	Private 84/228 (36,8%)	Public 107/228 (46,9%)	University 56/228 (24,6%)
SUBSPECIALTY	Upper limb 72/228 (31,6%)	Lower limb 171/228 (75%)	Spine 15/228 (6,6%)
EXPERIENCE	< 5 years 64/228 (28,1 %)	5 to 10 years 43/228 (18,9%)	> 10 years 121/228 (53,1%)

MRSA screening. 54.8% of participating surgeons never screen, 34.6% screen routinely and 10.5% if they have additional risk factors such as obesity, diabetes, smoking...

Hair removal. 68.3% of the surgeons practice systematic depilation (of the surgical area or the operated limb), 18.5% when the patient presents hirsutism. Among them, 17.7% use a mechanical razor with a blade.

Local disinfection. Alcoholic Iso-Betadine is widely used in Belgium to disinfect the surgical site (69.3%). However, there is a greater tendency to use Chlorhexidine in Flanders compared to Wallonia and Brussels (33.6% vs. 15.5% vs. 10%) ($p < 0.01$) (Fig. 3).

Antibiotic prophylaxis. 42.1% of the surgeons chose a delay between injection and incision of less than 30 minutes, 55.7% between 30 and 60 minutes and 2.2% between 60 and 120 minutes. 0% felt that the delay should be > 120 minutes or after incision. However, 44.7% do not wait for the injection time to be respected before incising.

Plastic incise drapes. It is used in 79.8% of cases. In the university setting there was a higher percentage of never using it compared to public or private hospitals (31% vs. 18.9% vs. 18.3%) ($p < 0.05$) (Fig. 4).

We could not find any influence of the level of experience on all the questions asked.

DISCUSSION

SSI is defined as an infection occurring within 30 days of an operation and affecting the skin (or mucous membranes), subcutaneous tissues or tissues above the covering fascia *(3)*. Based on the analysis of available scientific evidence, national and international entities regularly issue

What product do you use to disinfect the surgicale site	BRUSSELS	FLANDERS	WALLONIA
Chlorhexidine 0.5%	2	6,7	2,6
Chlorhexidine 2%	8	26,9	12,9
Acqueous isobetadine	6	5,6	15,5
Isobetadine alcohol	84	60,7	68,3

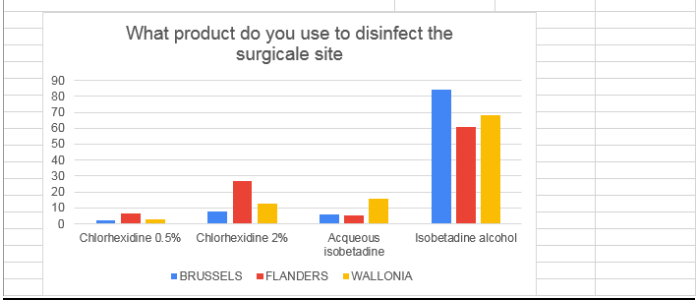

Fig. 3. — Antiseptic skin preparation of patient according to region

Do you use an incise drape during the procedure?	Private	Public	University
Never	18,3	18,9	31,0
Impregnated drape	76,1	66,3	50,0
Unimpregnated drape	5,6	14,7	19,0

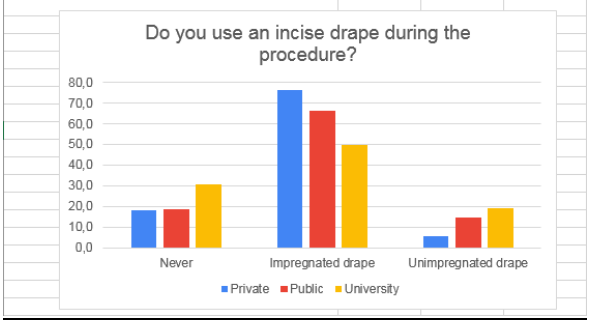

Fig. 4. — Using incise drape according to the type of hospital

Table III. — Results of the survey: preoperative preventive measures

PRE-OPERATIVE DENTAL CHECK-UP	Systematically 16/228 (7%)	Poor dental hygiene 55/228 (24,1 %)	Active infection in oral cavity 51/228 (22,4%)	Never 106/228 (46,5%)	
URINALYSIS	Systematically 24/228 (10,5%)	If urinary symptoms 95/228 (41,7%)	Never 109/228 (47,8%)		
IF ROUTINE URINALYSIS: DO YOU TREAT POSITIVE URINALYSIS?	Systematically 17/24 (68%)	Only if symptoms are present 8/24 (32%)			
NUTRITIONAL SUPPORT	Systematically 6/228 (2,6%)	Only if risk factors (obesity, undernutrition, diabetes, etc.) 99/228 (43,6%)	Never 122/228 (53,7%)		
SUSPENSION OF BIO-THERAPIES AND/OR IMMUNOSUPPRESSANTS	Systematically 52/228 (22,8%)	Biotherapies only 12/228 (5,3%)	Immunosuppressants only 36/228 (15,8%)	Not comfortable with this type of treatment 100/228 (43,9%)	Never 28/228 (12,3%)
SMOKING CESSATION	Systematically 107/228 (47,1%)	I recommend reducing smoking 83/228 (36,6%)	Never 37/228 (16,3%)		
IF SYSTEMATICALLY STOPPED: WEANING TIME?	From the consultation 55/107 (50 ,5%)	4 weeks 24/107 (22%)	10 days 8/107 (7,3%)	As soon as the patient feels ready 22/107 (20,2%)	
NASAL CARRIAGE SCREENING MRSA	Systematically 79/228 (34,6%)	If risk factors (smoking, obesity, etc.) 24/228 (10,5%)	Never 125/228 (54,8%)		
HAIR REMOVAL	The entire member 13/228 (5,7%)	The operating area 142/228 (62,6%)	Hirsutism 42/228 (18,5%)	Never 30/228 (13,2%)	
WHEN DO YOU DO THE HAIR REMOVAL?	The day before 136/198 (68,7%)	The same day 62/198 (31,3%)			
WHERE DO YOU DO THE HAIR REMOVAL?	Hospital room 128/198 (64,7%)	Operating theatre 28/198 (14,1%)	Intervention room 15/198 (7,6%)	At home 27/198 (13,6%)	
DEPILATION METHOD	Clipper 162/198 (81,8%)	Shaving 35/198 (17,7%)	Depilatory cream 1/198 (0,5%)		
PRE-SURGICAL SKIN PREPARATION	Acqueous isobetadine 22/228 (9,6%)	Isobetadine alcohol 158/228 (69,3%)	Chlorhexidine 0.5% 10/228 (4,4%)	Chlorhexidine 2% 38/228 (16,7%)	
ANTIBIOTIC PROPHYLAXIS, IS THE TIME FRAME IMPORTANT?	Yes 214/228 (94,7%)	No 12/228 (5,3%)			
TIME BETWEEN ANTIBIOTIC PROPHYLAXIS INJECTION AND INCISION	30 minutes 96/228 (42,1%)	Between 30 and 60 minutes 127/228 (55,7%)	>60 minutes 5/228 (2,2%)	>120 minutes 0/228 (0%)	After incision 0/228 (0%)
DO YOU SPECIFY THE NATURE OF THE ANTIBIPROPHYLAXIS BEFORE THE INCISION?	Yes 198/228 (86,8%)	No 30/228 (13,2%)			
DO YOU SPECIFY THE TIME OF INJECTION OF ANTIBIOTIC PROPHYLAXIS BEFORE THE INCISION?	Yes 93/228 (40,8%)	No 135/228 (59,2%)			
DO YOU RESPECT THE TIME BETWEEN THE INJECTION OF ANTIBIOTIC PROPHYLAXIS AND THE INCISION?	Yes 126/228 (55,3%)	No 102/228 (44,7%)			
INCISE DRAPE	Impregnated drape 154/228 (67,5%)	Unimpregnated drape 28/228 (12,3%)	Never 46/228 (20,2%)		

Table IV. — Summary of recommendations from international clinical practice guidelines

Recommandations	NICE [30] (2008,2017)	SHEA/IDSA [31] (2014)	WHO [16] (2016)	CDC [29] (2017)
DENTAL CHECK-UP	Preoperative checklist	N/A	Preoperative checklist	N/A
URINALYSIS	N/A	N/A	N/A	N/A
DECOLONISATION MRSA	Systematic decolonisation is not recommended	Screening and decolonisation of high-risk patients	Systematic screening	Multidisciplinary screening strategy
BIOTHERAPIES AND IMMUNOSUPPRESSANTS	N/A	Suspend treatment if possible	Suspension not recommended	N/A
PRE-OPERATIVE SMOKING CESSATION	Tobacco is a risk factor	Tobacco is a risk factor	Tobacco is a risk factor	Tobacco is a risk factor
NUTRITIONAL support/ SUPPLEMENTS	N/A	N/A	Nutrient-rich formulas for patients at risk	N/A
HAIR REMOVAL	Not recommended (clipper if required)	Not recommended (clipper if required)	Not recommended (clipper if required)	Not recommended (clipper if required)
ANTIBIOTIC PROPHYLAXIS	Injection at the beginning of anaesthesia and before tourniquet inflation	As close to the incision as possible, within 60 minutes	Within 120 minutes considering the half-life of the antibiotic	N/A
PRE-SURGICAL SKIN PREPARATION	Aqueous or alcoholic solution PVI or CHG	Alcoholic solution PVI or CHG	Alcoholic solution CHG	Alcoholic solution
INCISE DRAPE	Not recommended (impregnated drape if necessary)	Not recommended	Not recommended	Not recommended

recommendations for preoperative measures to limit SSI.

A summary of these recommendations is shown in Table IV.

Routine **dental check-up** pre-operatively is not necessary. However, it is reasonable to require dental screening for patients with risk factors for dental disease or to postpone elective surgery in patients who have active infections in the oral cavity until it has been cleared *(4)*.

Urinalysis should not be performed routinely but only if the patient presents with urinary symptoms *(5)*. Antibiotics for bacteriuria only reduce the risk of surgical site infection if it is symptomatic *(6)*. It is recommended to avoid routine urine screening in asymptomatic patients prior to orthopaedic surgery because the discovery and treatment of asymptomatic bacteriuria, unlike symptomatic bacteriuria, does not prevent joint infections and is, moreover, associated with adverse events, unnecessary costs and the development of resistance due to overuse of antibiotics *(7,8)*.

Malnutrition can increase the risk of post-operative complications. It is present in 50% of orthopaedic inpatients and can worsen during the stay due to surgical stress *(9)*. The identification of patients at risk of malnutrition and the provision of appropriate nutritional support is important. In order to formulate and institute a nutritional plan, Deren et al. propose a multidisciplinary approach including general practitioners, nutritionists and dieticians *(10)*.

Biotherapies for patients with rheumatoid arthritis or other inflammatory rheumatism should be suspended, except in cases of severe systemic lupus erythematosus (SLE), with a time delay between injection and prosthesis specific to each molecule. On the other hand, synthetic disease-modifying anti-rheumatic drugs (DMARDs) are generally continued. The time frame for each of the drugs has been summarised by the American Association of Hip and Knee Surgeons (AAHKS) and the American College of Rheumatology (ACR) *(11)*. The immunosuppressive effect of the drugs could lead to impaired wound healing and an increased risk of infection in patients treated with these agents *(12)*.

Smoking is known to be an important risk factor for SSI (Table IV). Meta-analytic studies *(13,14)* have shown that referral to a smoking cessation program 4 weeks preoperatively is associated with fewer complications, especially wound-related problems.

Regarding **MRSA screening**, there is no agreement between national recommendations in Belgium and

international recommendations. The Belgian Health Council recommends a multidisciplinary approach, between the operational hospital hygiene team and the surgical team(s), to determine the place of screening for MRSA carriers preoperatively. And, depending on the circumstances, decolonisation may be recommended when the test is positive *(15)*. The World Health Organization recommends systematic screening, although the level of evidence for this recommendation is not high *(16)*.

Hair removal is still widely used in preoperative preparation in developed countries. It may be necessary to facilitate adequate exposure and skin marking. A WHO meta-analysis evaluating non-depilation or depilation preoperatively *(16)* showed that depilation had no benefit on the SSI rate compared to no depilation. In contrast, shaving with razors clearly showed an increased risk of SSI *(17)*. These adverse results of shaving are attributed to the microtrauma inflicted on the skin during the shaving process, which then creates a nidus where bacteria can grow and promote SSI *(18,19)*. The World Health Organization does not recommend routine preoperative hair removal and, if necessary, recommends the use of clippers *(16)*.

Two **antiseptics** are mainly used in Belgium for pre-surgical skin preparation: chlorhexidine gluconate (CHG) or povidone-iodine (PVI) antiseptic. PVI has a broad spectrum of activity, including all bacteria and fungi, and is not known to have acquired resistance. CHG has a less broad spectrum of activity, especially against Gram-negative bacilli, and is the only major antiseptic for which resistance phenomena can occur *(20)*. On the other hand, its main interest lies in its prolonged duration of action and its rapidity of action *(21)*. In Belgium, the Superior Council of Health does not rule on the recommendations between aqueous and alcoholic solutions because, according to it, there is no formal proof that alcoholic solutions are superior to aqueous solutions in reducing the number of postoperative infections *(15,22)*. The WHO *(16)* has conducted four meta-analyses on the use of antiseptics. It showed that alcoholic antiseptics resulted in fewer SSIs than aqueous antiseptics for all antiseptics combined (OR: 0.60; 95% CI: 0.45-0.78). Because of its longer residual time, the use of CHG can be proposed for longer surgeries *(21,23)*.

The incidence of postoperative infection in prosthetic joint surgery without antibiotic prophylaxis is 3 to 5%. **Antibiotic prophylaxis** reduces this rate to less than 1% *(24)*. It is now known, since the study by Classen et al. *(25)*, that administration more than 120 minutes before incision or after incision is associated with a higher risk of SSI. The WHO *(16)* recommends that antibiotic prophylaxis should be administered within 120 minutes before incision while considering the half-life of the antibiotic (<60 min before incision for first and second generation cephalosporins). The optimal timing seems to be between 30 and 60 minutes when using cephalosporins depending on the half-life and infusion time *(26,27)*.

The rate of intraoperative use of **plastic incise drapes** is high. The mythat it reduces the migration of micro-organisms from the surrounding skin to the surgical site is a current concept, but there is no evidence that they reduce ISO. The WHO conducted a meta-analysis evaluating impregnated and non-impregnated drapes *(16)* and found that incise drapes had no benefit on SSI rates compared to no drapes. On the other hand, unimpregnated drapes have a higher proportion of SSIs *(28)*. The WHO and the International Consensus Meeting in Philadelphia do not recommend the use of incise drapes on the basis of the current literature but highlight the need for more high level evidence studies *(16,29)*.

The number of surgeons participating in the survey, 228/840 members of SORBCOT and BVOT, seems sufficiently representative. The study may be limited by self-reporting bias. Despite this, we believe that there is a representation of different regions, hospital type, surgeon experience and surgical subspecialties in orthopaedics. This suggests that the results can be representative to the reality of orthopaedic surgical practice in Belgium.

The audit that was carried out in this study aims to determine the rate of implementation of these measures. However, the results show a great variability in the application of some of the basic measures. The variability in practice can be explained by the fact that

– The guidelines, from international entities, are not always specific to the field of orthopaedics, and although they deal with surgeries involving implants, many other non-orthopaedic disciplines are included in the analyses.

– Most recommendations have been evaluated in controlled studies, some with contrasting results, while others are the result of observations or consensus surgical practices and can hardly be subjected to structured scientific analysis.

– Due to the low rate of surgical wound infection in patients who have undergone clean (Altemeier Class I) or clean-contaminated (Altemeier Class II) surgery, studies aimed at reducing the incidence of these infections often lack the statistical power to detect significant differences (Type 2 error: β).

– Periodically, entities such as NICE *(30)*, SHEA/IDSA *(31)*, CDC *(29)* or WHO *(16)* publish recommendations based on the analysis of available scientific evidence. Although based on the same original evidence, these recommendations sometimes do not show similar conclusions (Table IV)

CONCLUSION

Most of the recommendations are followed by Belgian surgeons. Some practices (depilation and use of impregnated incise drapes) do not influence the rate of SSI, and are therefore not recommended by international entities, but are nevertheless widely used. Other practices are even known to increase the SSI rate and are maintained by a significant percentage of surgeons in the survey, such as the use of shaving with razors and the non-impregnated incise drape. Some habits can be improved. This is the case for the management of treatment in patients with rheumatic diseases, the 4-week smoking cessation period and only treating positive urinalysis when it is symptomatic. Orthopaedic-specific guidelines should be developed in the future to fully address the unique issues and concerns of this patient population through prospective randomised studies.

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