

Foot and Ankle



Prevention



F-1 (Former F- 17) What are the important risk factors that predispose a patient to infection of total ankle arthroplasty?

RESEARCHED BY:



Senneville, Eric MD, France



Aiyer, Amiethab MD, USA



Literature:

- ***Meta-analysis/Systematic Review 1**
- ***Prospective/Randomized 0**
- ***Retrospective 9**

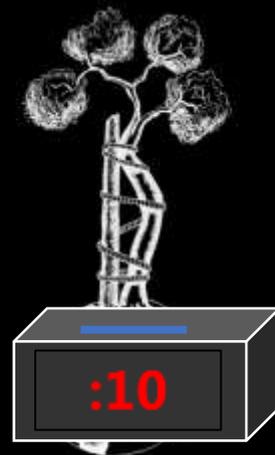
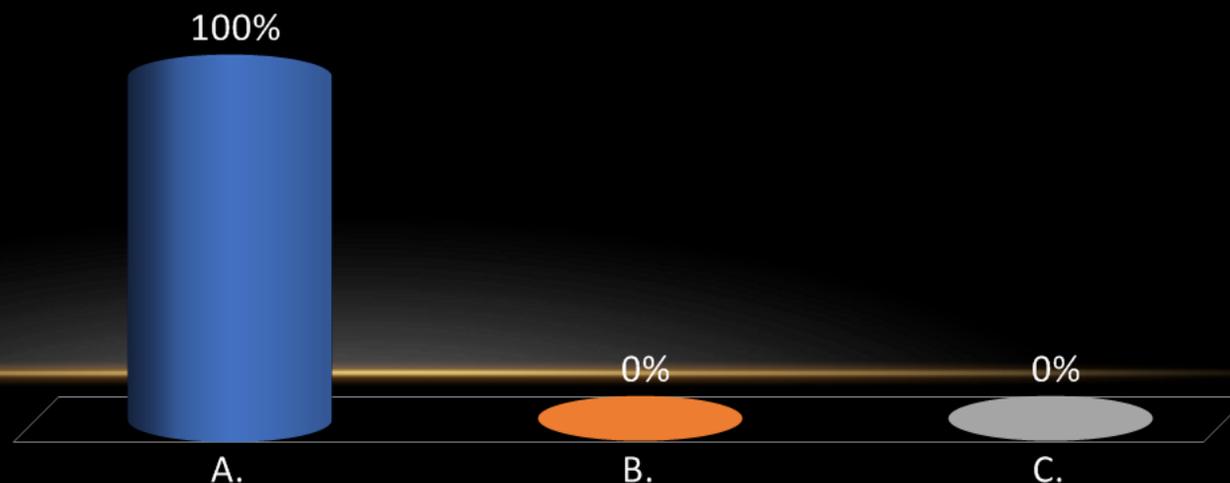
*** Strong evidence demonstrating that inflammatory arthritis, prior ankle surgery, age <65 years, BMI<19, peripheral vascular disease, chronic lung disease, hypothyroidism, low preoperative American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot score are important risk factors; conflicting evidence on obesity >30 BMI, tobacco use, diabetes, and duration of surgery**



Recommendation: There is evidence indicating that the following risk factors may predispose a patient to an infection of a total ankle arthroplasty (TAA): inflammatory arthritis, prior ankle surgery, body mass index (BMI) <19, peripheral vascular disease. Meanwhile, there is conflicting evidence (which may be due to patient selection bias) indicating that the following risk factors may predispose a patient to infection of a total ankle arthroplasty: obesity >30 BMI, tobacco use, diabetes, duration of surgery, age <65 years, hypothyroidism, low preoperative American Orthopaedic Foot and Ankle Society (AOFAS) hindfoot score, and chronic lung disease.

Level of Evidence: Limited

- A. Agree
- B. Disagree
- C. Abstain



F-2 (Former F- 3) Does intra-articular injection of ankle with corticosteroids increase the risk of subsequent PJI following TAA? If so, how long after a prior intra-articular injection can TAA be safely performed?

RESEARCHED BY:



Uçkay, Ilker MD, Switzerland



Hirose, Christopher MD, USA



Literature:

- ***Meta-analysis/Systematic Review 3**
- ***Prospective/Randomized 0**
- ***Retrospective 8**

*** No evidence in regards to the risk of PJI after steroid injection in the setting of total ankle arthroplasty**

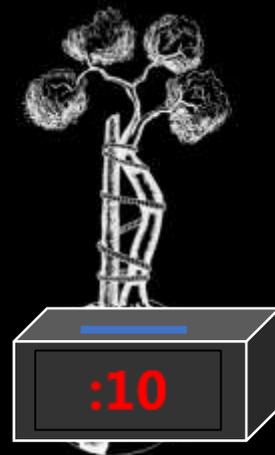
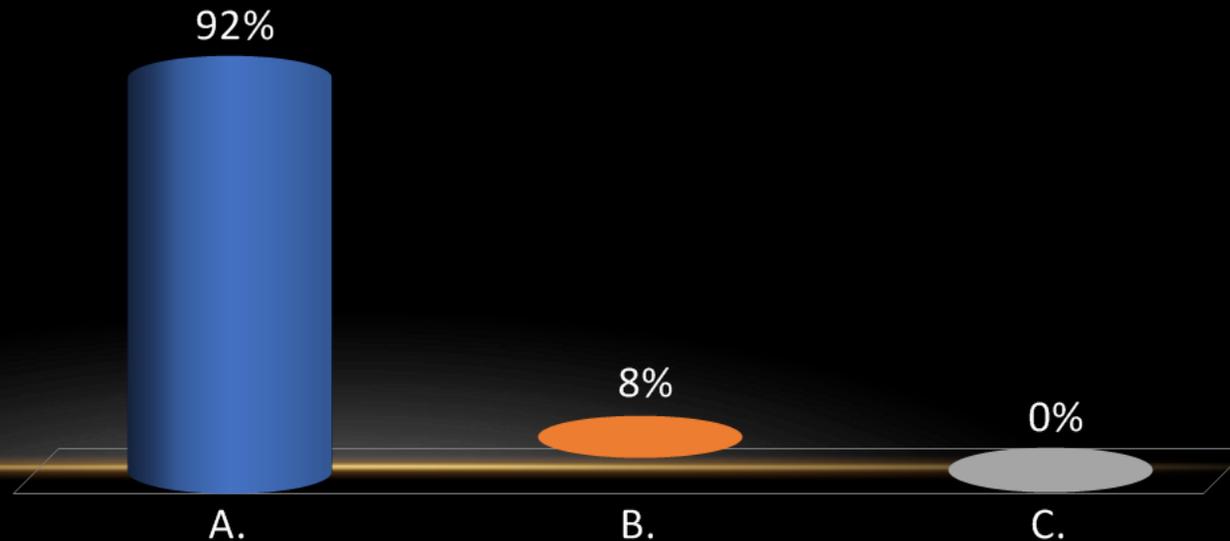


Recommendation: Every intra-articular injection of the ankle is an invasive procedure associated with potential healthcare-associated infections, including periprosthetic joint infection (PJI) following TAA. Based on the limited current literature, the ideal timing for elective total ankle arthroplasty (TAA) after corticosteroid injection for the symptomatic native ankle joint is unknown.

Based on the knee arthroplasty literature, the consensus recommends at least 3 months after corticosteroid injection prior to performing TAA.

Level of Evidence: Limited

- A. Agree
- B. Disagree
- C. Abstain



F-3 (Former F- 14) Should routine MRSA screening be in place prior to total ankle arthroplasty?

RESEARCHED BY:



Kaplan, Jonathan MD, USA



Slullitel, Gaston MD, Argentina



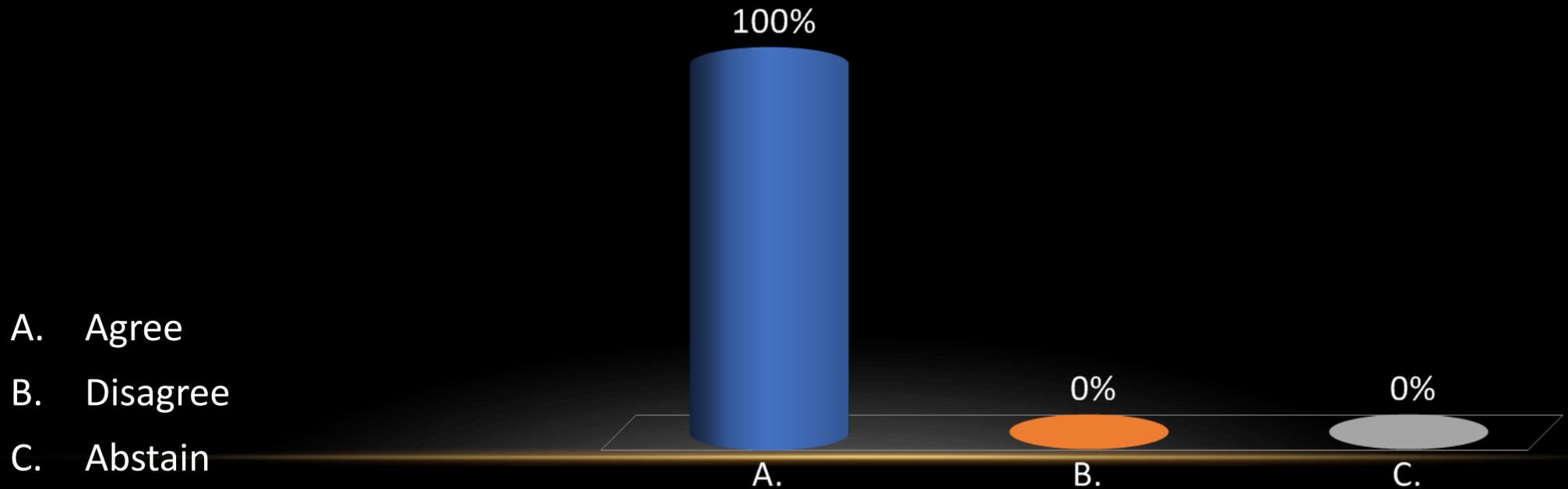
Literature:

- ***Meta-analysis/Systematic Review 2**
 - ***Prospective/Randomized 0**
 - ***Retrospective 11**
- * Inconclusive evidence supporting MRSA screening and decolonization in patients undergoing total ankle arthroplasty**

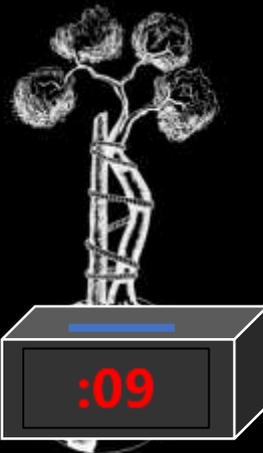


Recommendation: Unknown. The role of screening for methicillin-resistant *Staphylococcus aureus* (MRSA) and decolonization prior to total ankle arthroplasty remains unclear. While there is strong evidence for this in hip and knee arthroplasty literature, further data is needed to support this practice in TAA, which can be costly and logistically difficult to implement.

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-4 (Former F- 38) What preoperative optimization should be implemented to reduce the risk of SSI/PJI in patients undergoing total ankle arthroplasty?

RESEARCHED BY:



Emara, Khaled J MD, Egypt



Hirose, Christopher MD, USA



Literature:

- ***Meta-analysis/Systematic Review 2**
- ***Prospective/Randomized 1**
- ***Retrospective 22**

***Limited evidence for optimization of patient and/or surgical site optimization prior to total ankle arthroplasty**

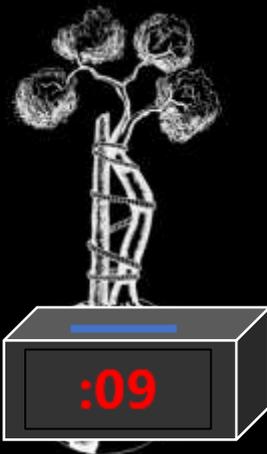
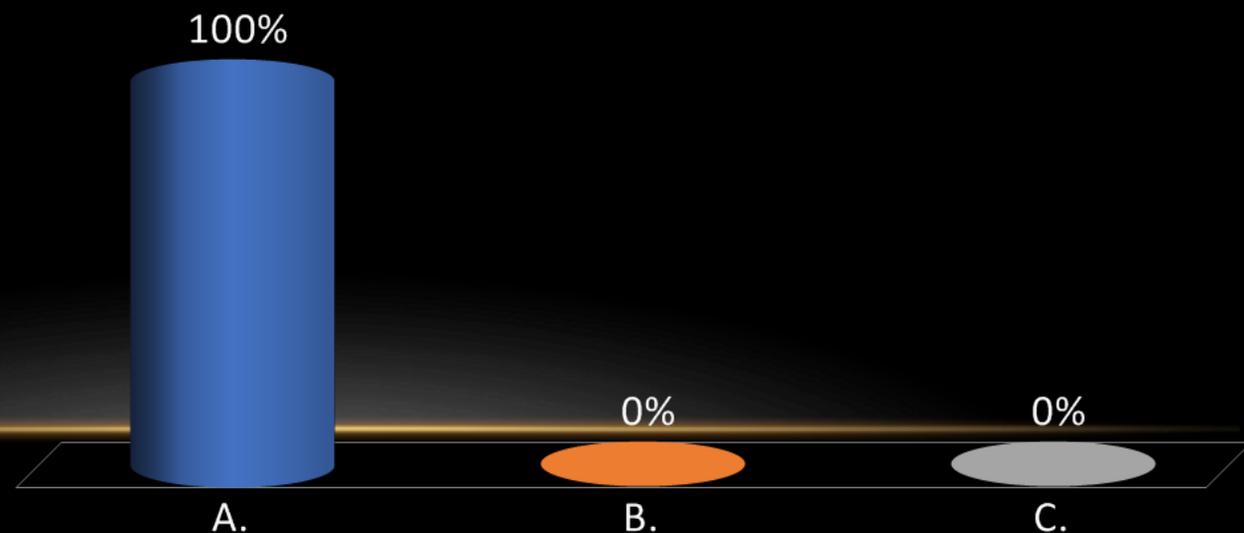


Recommendation: We recommend that patients awaiting TAA be optimized prior to surgery by implementing skin cleansing, nutritional status enhancement, glycemic control, BMI optimization, smoking cessation, and management of immune-modulating comorbidities.

At the time of surgery, there is strong evidence that optimal preparation of the surgical site with an alcohol-containing agent, weight-based and timely administration of antibiotic prophylaxis, and reducing operating room traffic should also be put in place.

Level of Evidence: Moderate

- A. Agree
- B. Disagree
- C. Abstain



F-5 (Former F- 39) What prophylactic antibiotic (type, dose and route of administration) should be administered perioperatively for patients undergoing total ankle arthroplasty?

RESEARCHED BY:



Sanchez, Marisa MD, Argentina



Literature:

- ***Meta-analysis/Systematic Review 1**
- ***Prospective/Randomized 0**
- ***Retrospective 14**

***Lack of evidence for utilization of antimicrobial prophylaxis in total ankle arthroplasty**



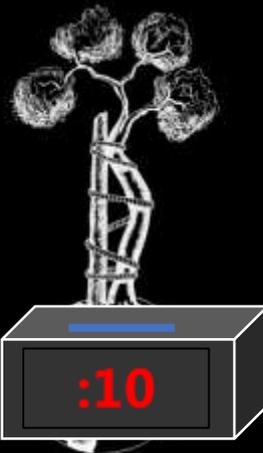
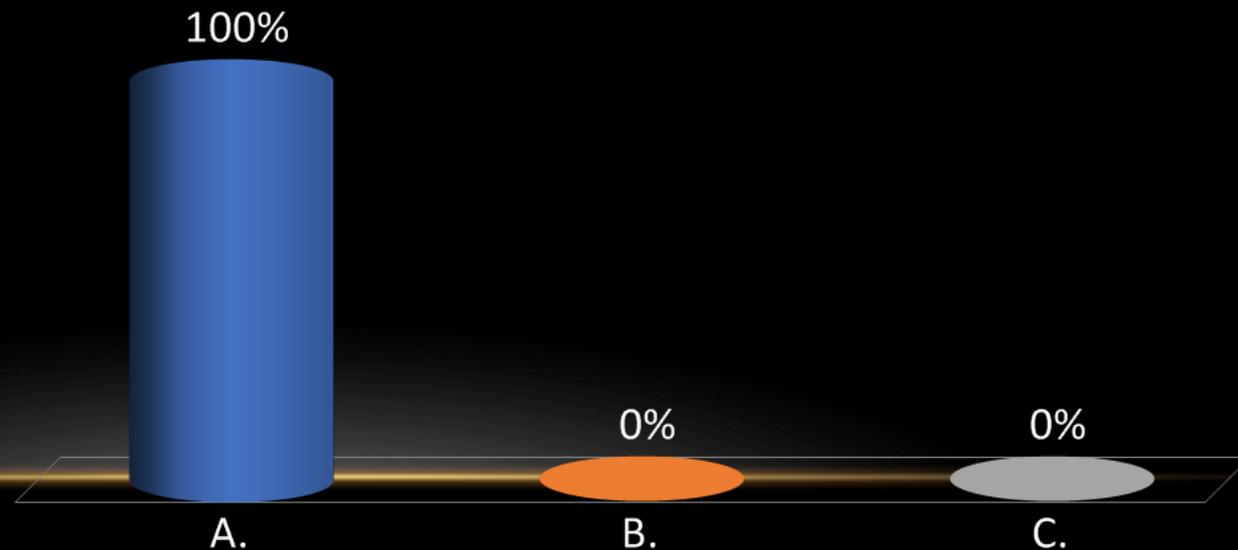
Recommendation: The administration of prophylactic antibiotics before total ankle arthroplasty (TAA) potentially reduces the incidence of surgical site infection (SSI) and/or periprosthetic joint infection (PJI). Weight-based (of at least 2 grams) Cefazolin administered intravenously within 60 minutes prior to the procedure to be an adequate choice for antibiotic prophylaxis.

If the patient has a beta-lactam anaphylaxis, we recommend an appropriate alternative antibiotic effective against staphylococcus.

It is unclear whether prophylaxis should be given as a single dose or as multiple doses.

Level of Evidence: Strong

- A. Agree
- B. Disagree
- C. Abstain



F-6 (Former F- 29) What is the optimal management of patients with prior septic arthritis of the ankle who are undergoing total ankle arthroplasty?

RESEARCHED BY:



Winters, Brian MD, USA



Da Rin de Lorenzo, Ferdinando MD, Italy



Literature:

- ***Meta-analysis/Systematic Review 0**
 - ***Prospective/Randomized 0**
 - ***Retrospective 3**
- * Limited evidence on total ankle arthroplasty in patients with a history of infection involving the ankle**

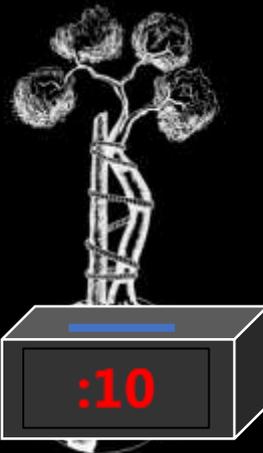
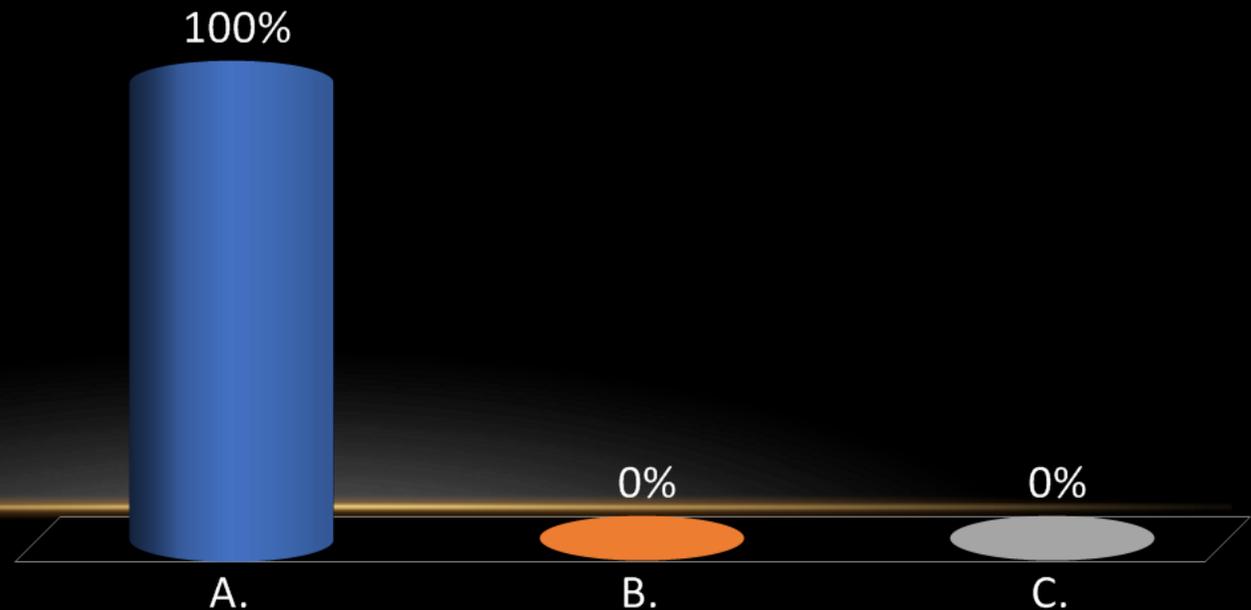


Recommendation: There is a paucity of data regarding total ankle arthroplasty (TAA) in patients with prior infection involving the ankle, whether it is septic arthritis, osteomyelitis, or infection of the surrounding soft tissues.

We recommend that patients with prior infections in the affected ankle be worked up for infection, including thorough history and physical examination, as well as ordering serological tests and possible aspiration of the joint. During ankle arthroplasty in patients with prior infection, antibiotics should be added to the cement (if used) and the joint should be thoroughly cleansed. Intraoperative cultures of bone and soft tissue should also be obtained.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-7 (Former F- 5) During draping for TAA, should the foot be prepped into the surgical field or be covered?

RESEARCHED BY:



Kaplan, Jonathan MD, USA



Embil, John M MD, Canada



Literature:

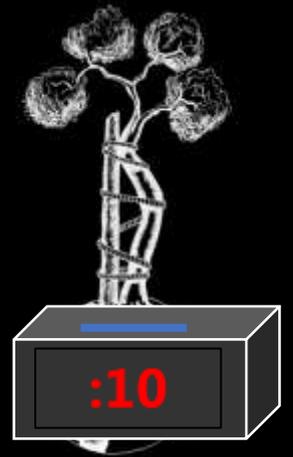
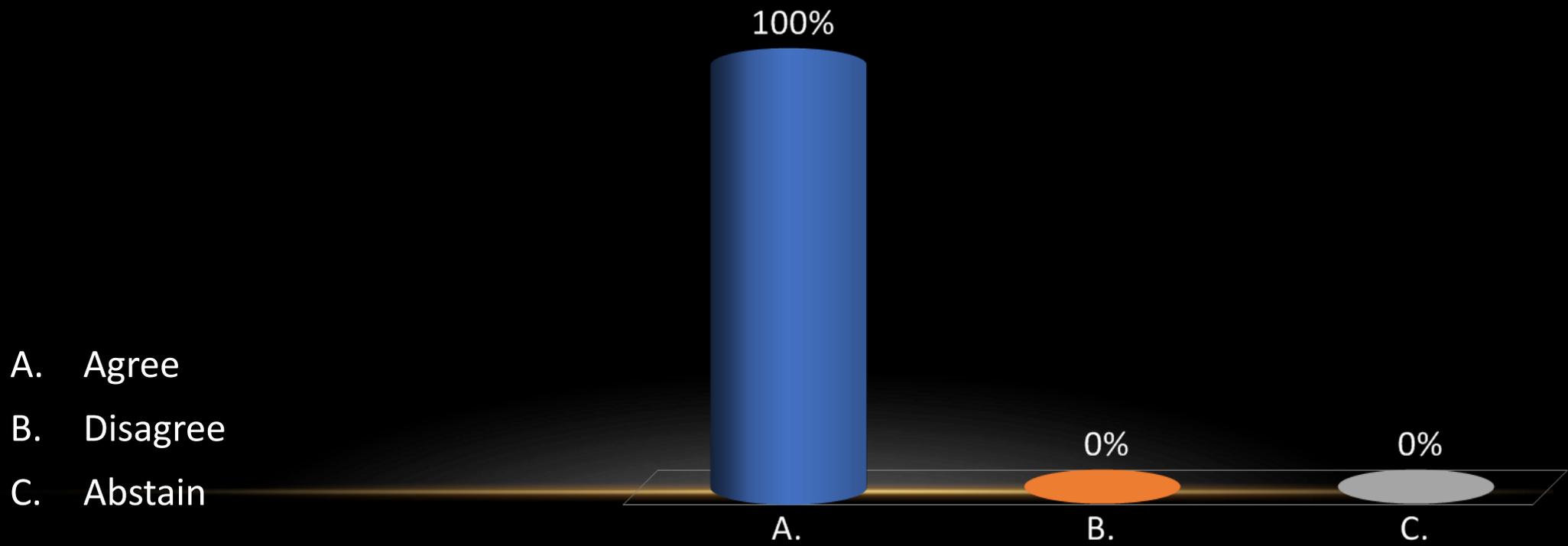
- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 3**
- ***Retrospective 3**

*** Limited evidence assessing surgical preparation and/or coverage of the foot in foot and ankle surgery**



Recommendation: There is insufficient data demonstrating any advantage or disadvantage to covering the toes during total ankle arthroplasty.

Level of Evidence: Consensus



F-8 (Former F- 10) Should antibiotic-impregnated cement be used during primary total ankle arthroplasty?

RESEARCHED BY:



Richter, Jens MD, Germany



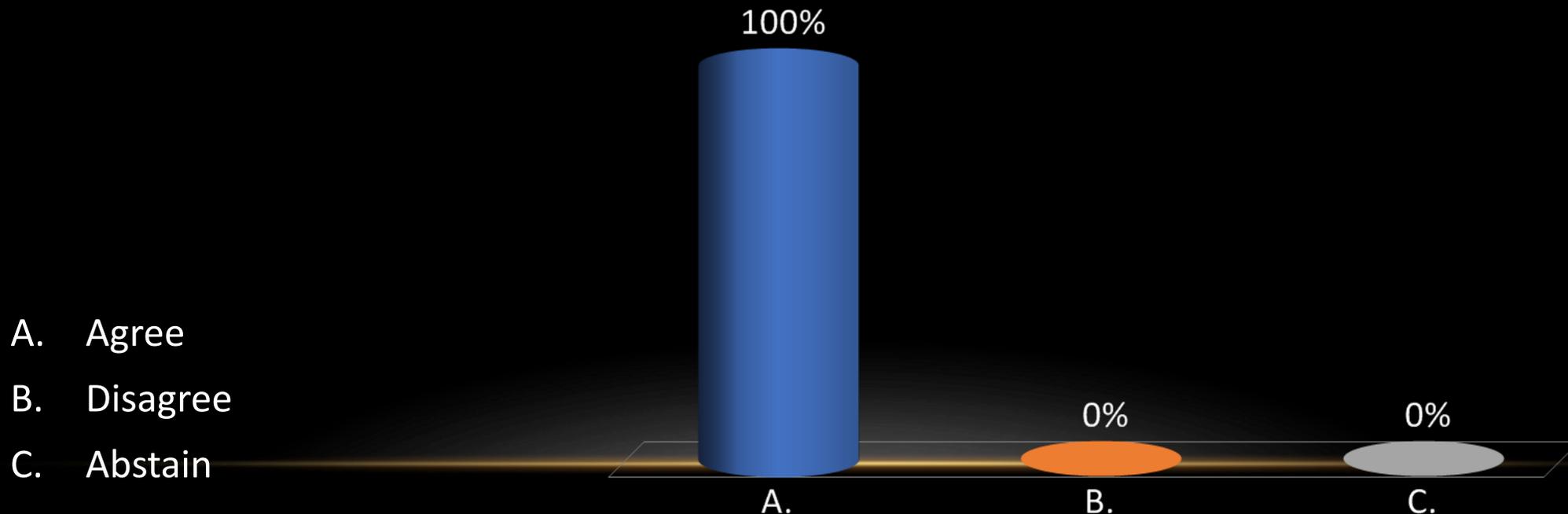
Literature:

- ***Meta-analysis/Systematic Review 1**
 - ***Prospective/Randomized 0**
 - ***Retrospective 3**
- * Lack of evidence on antibiotic-impregnated cement in TAA**

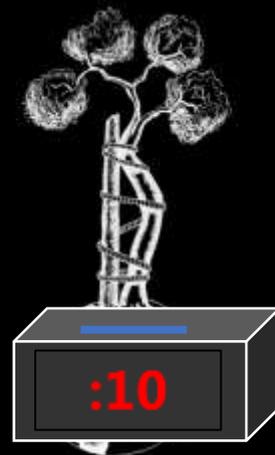


Recommendation: Unknown. There is insufficient evidence for the routine use of antibiotic-impregnated cement during primary total ankle arthroplasty (TAA).

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-9 (Former F- 16) What are the benefits and risks associated with the use of vancomycin powder in the wound during total ankle arthroplasty or other foot and ankle procedures?

RESEARCHED BY:



Slullitel, Gaston MD, Argentina



Tanaka, Yasuhito MD, Japan



Literature:

- ***Meta-analysis/Systematic Review 4**
- ***Prospective/Randomized 1**
- ***Retrospective 5**

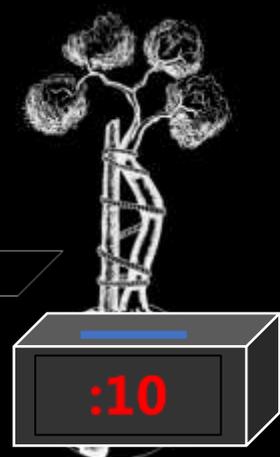
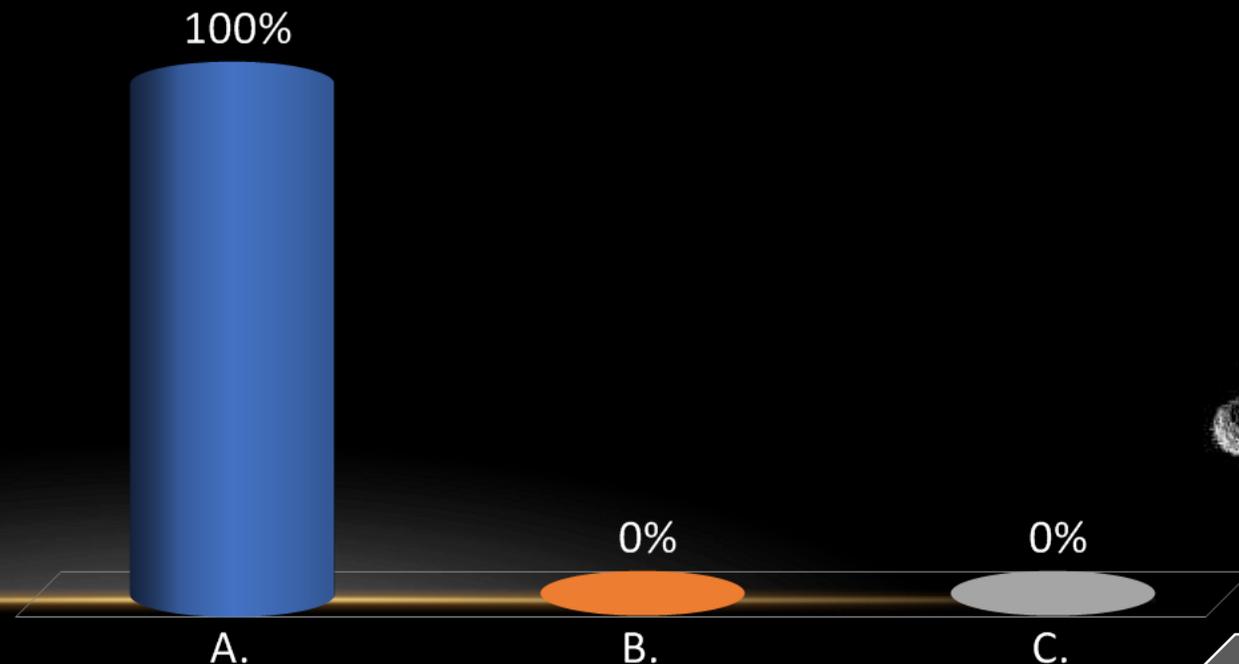
***Lack of evidence for vancomycin powder use during total ankle arthroplasty and other foot and ankle procedures**



Recommendation: Though one study supporting topically applied vancomycin has shown to reduce the rate of deep infection in diabetic patients undergoing foot and ankle surgery. There is, however, insufficient evidence to evaluate any additional benefits or whether any risks exist when utilizing vancomycin powder during total ankle arthroplasty or other foot and ankle procedures in a general population.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-10 (Former F- 9) Is there a role for the use of dilute betadine irrigation or other antiseptic irrigation solutions during total ankle arthroplasty or other foot and ankle procedures?

RESEARCHED BY:



Englund, Kristin MD, USA



Heidari, Nima MD, UK



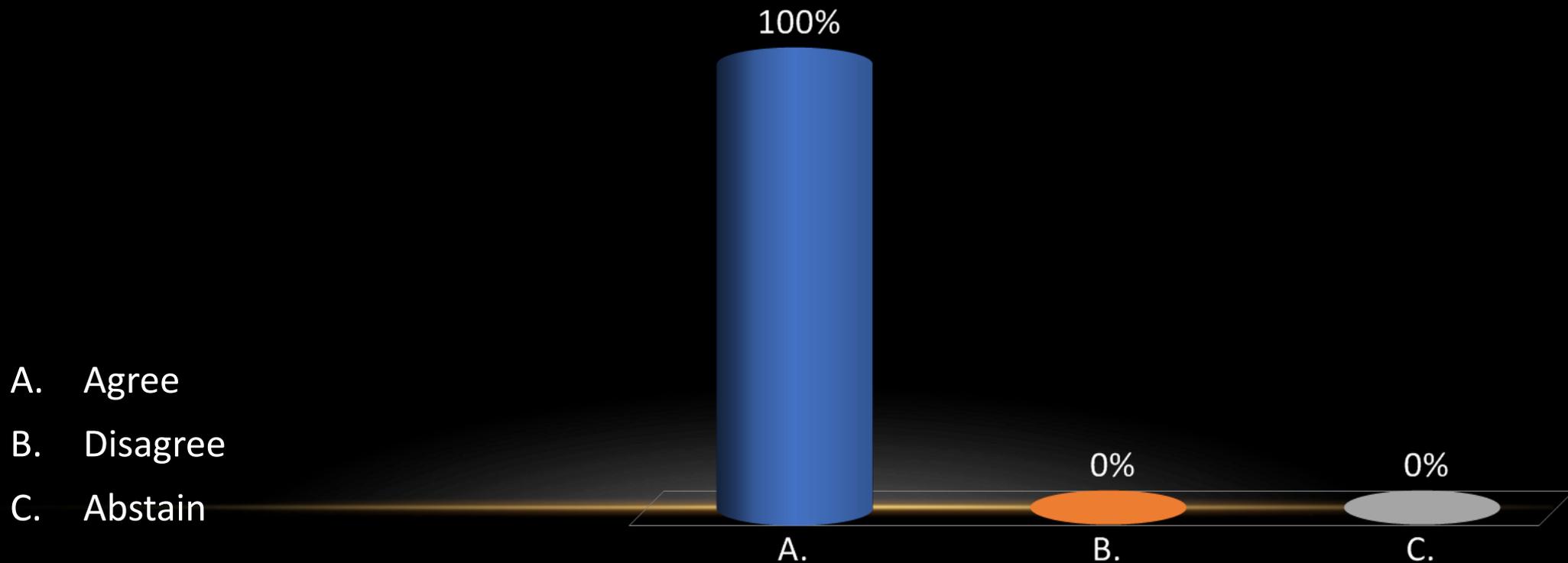
Literature:

- ***Meta-analysis/Systematic Review 4**
 - ***Prospective/Randomized 2**
 - ***Retrospective 3**
- * Lack of evidence for use of dilute betadine irrigation or other antiseptic irrigation in foot and ankle surgery**

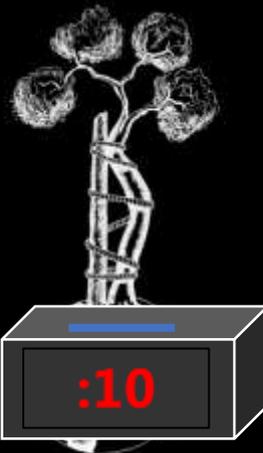


Recommendation: With regards to total ankle arthroplasty, there is lack of evidence to recommend for or against the use of povidone-iodine (betadine) solution.

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-11 (Former F- 4) Does revascularization prior to foot and ankle surgery reduce the incidence of SSI?

RESEARCHED BY:



Heidari, Nima MD, UK



Literature:

- ***Meta-analysis/Systematic Review 2**
- ***Prospective/Randomized 0**
- ***Retrospective 20**

*** Lack of evidence on effects of revascularization prior to foot and ankle surgery.**

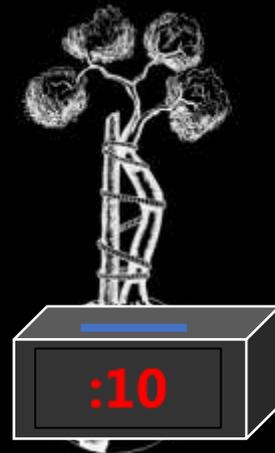
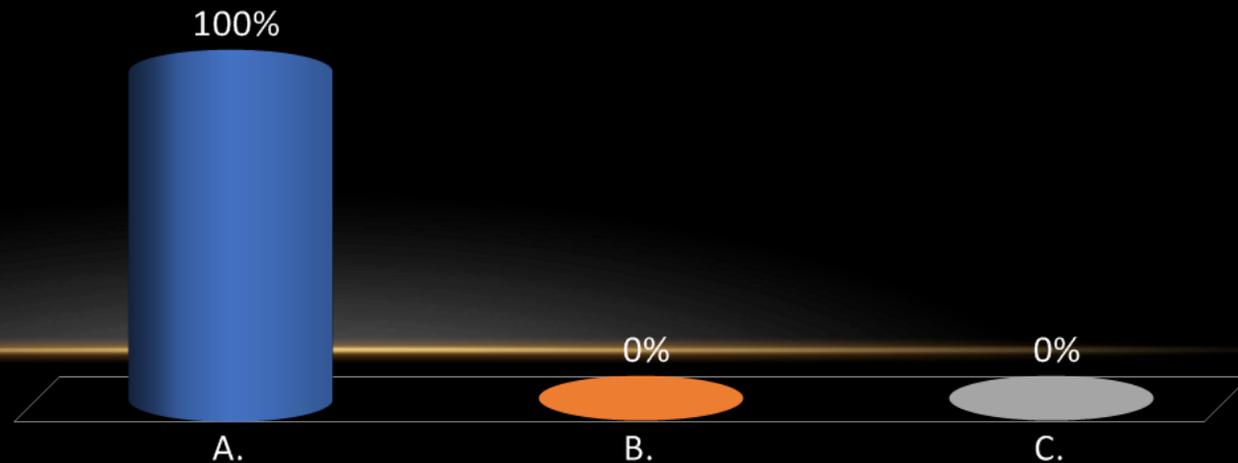


Recommendation: Several studies support the effect of peripheral vascular disease (PVD) on wound healing and surgical site infection (SSI). Despite this, there have been no specific studies proving the beneficial effect of revascularization on SSI prior to surgical intervention in the setting of traumatic or elective foot and ankle surgery. The majorities of studies on revascularization are in the setting of diabetic foot infection or established ischemia.

By consensus, we recommend that in the presence of an inadequate vascularization in the foot and ankle, that vascular optimization be undertaken prior to elective surgery.

Level of Evidence: Limited

- A. Agree
- B. Disagree
- C. Abstain



F-12 (Former F- 1) Are prophylactic perioperative antibiotics required for isolated forefoot procedures, such as hammertoes?

RESEARCHED BY:



Oh, Irvin MD, USA



Englund, Kristin MD, USA



Literature:

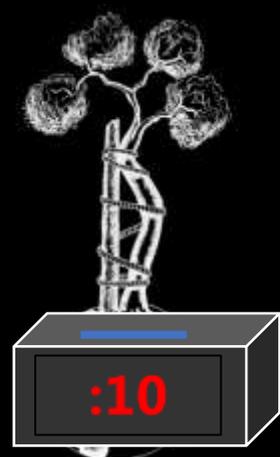
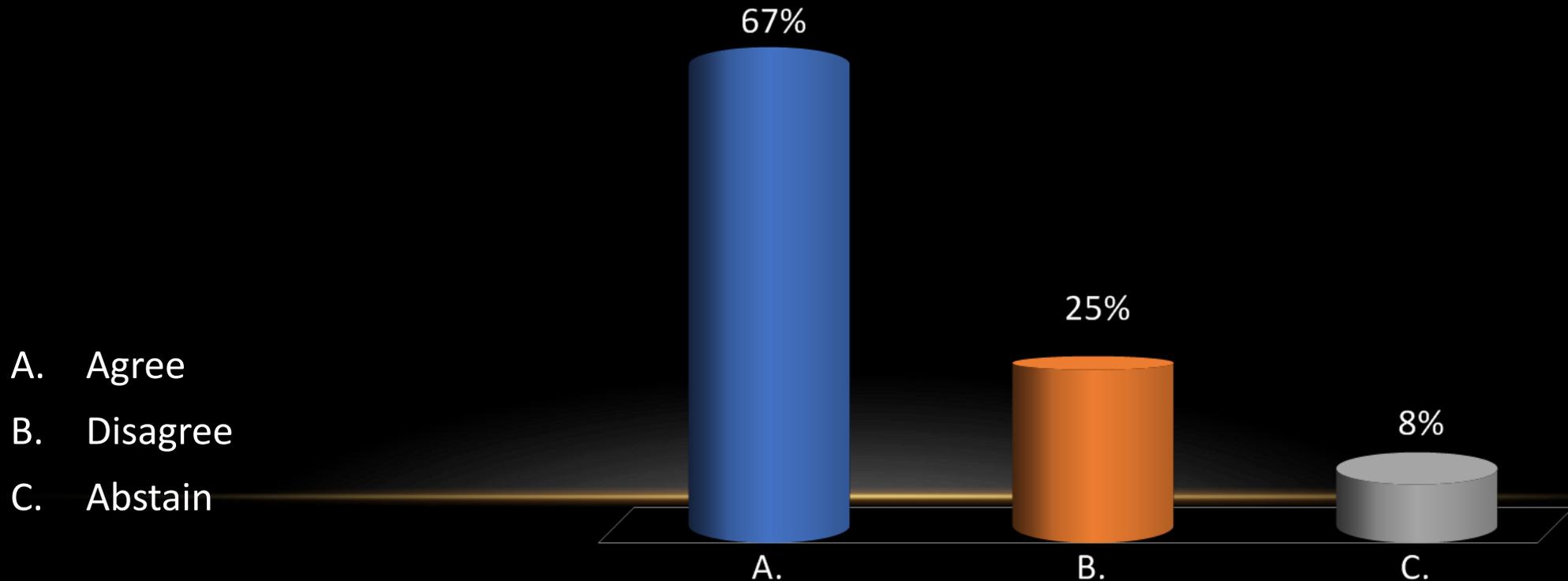
- ***Meta-analysis/Systematic Review 2**
- ***Prospective/Randomized 2**
- ***Retrospective 3**

***Lack of evidence to support administration of prophylactic intravenous antibiotics in elective forefoot surgeries**



Recommendation: Though limited clinical data exists, the administration of perioperative antibiotics is not required for isolated forefoot procedures in the absence of any risk factors, such as immunodeficiency or diabetes mellitus.

Level of Evidence: Limited



Diagnostic



F-13 (Former F- 25) What is the definition of acute and chronic PJI of total ankle arthroplasty?

RESEARCHED BY:



Aynardi, Michael MD, USA

Plöger, Milena M MD, Germany



Literature:

- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 1**
- ***Retrospective 23**

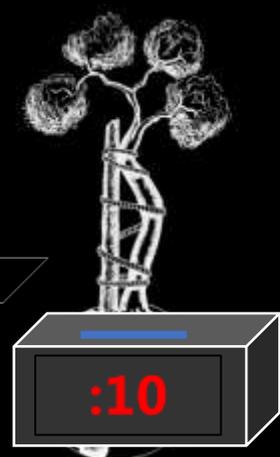
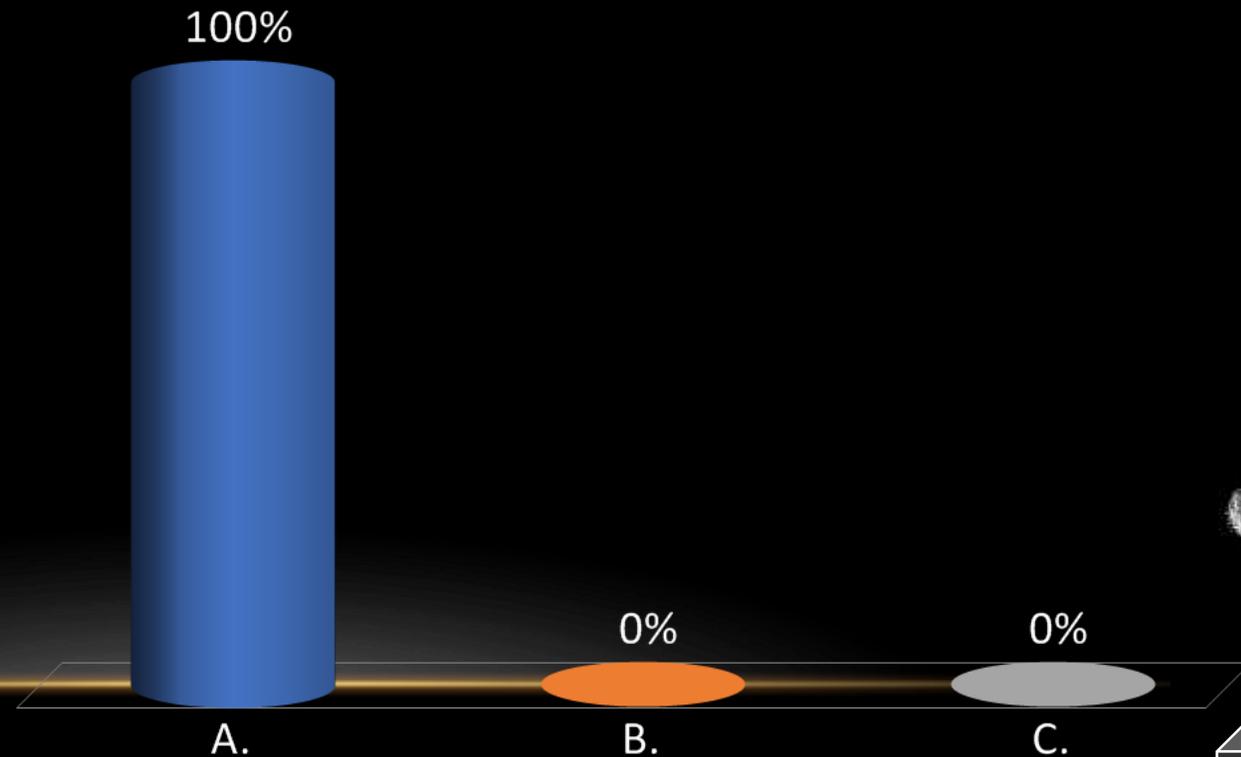
***No definitive criterion for defining acute or chronic PJI after ankle arthroplasty**



Recommendation: There is a paucity of data for defining acute or chronic periprosthetic joint infection (PJI) following total ankle replacement (TAA) in the literature. Any discussion of periprosthetic joint infection after ankle replacement is entirely reliant on the literature surrounding knee and hip arthroplasty.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-14 (Former F-26) What is the diagnostic "algorithm" for infected total ankle arthroplasty?

RESEARCHED BY:



Heidari, Nima MD, UK



Oh, Irvin MD, USA



Literature:

- ***Meta-analysis/Systematic Review 3**
- ***Prospective/Randomized 0**
- ***Retrospective 8**

***Lack of evidence validating utilization of the current hip and knee PJI diagnostic criteria from the Musculoskeletal Infection Society to ankle PJI**



Recommendation: Patients who present with clinical symptoms and signs of periprosthetic ankle infection (pain, erythema, warmth, sinus tract, abscess around the wound) and sinus tracts communicating with the ankle/subtalar joint are likely to have total ankle arthroplasty infection.

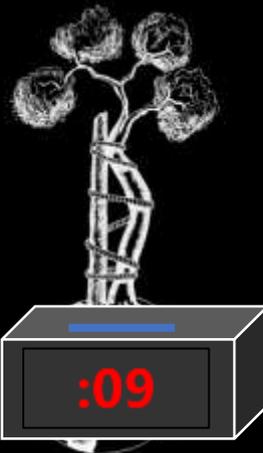
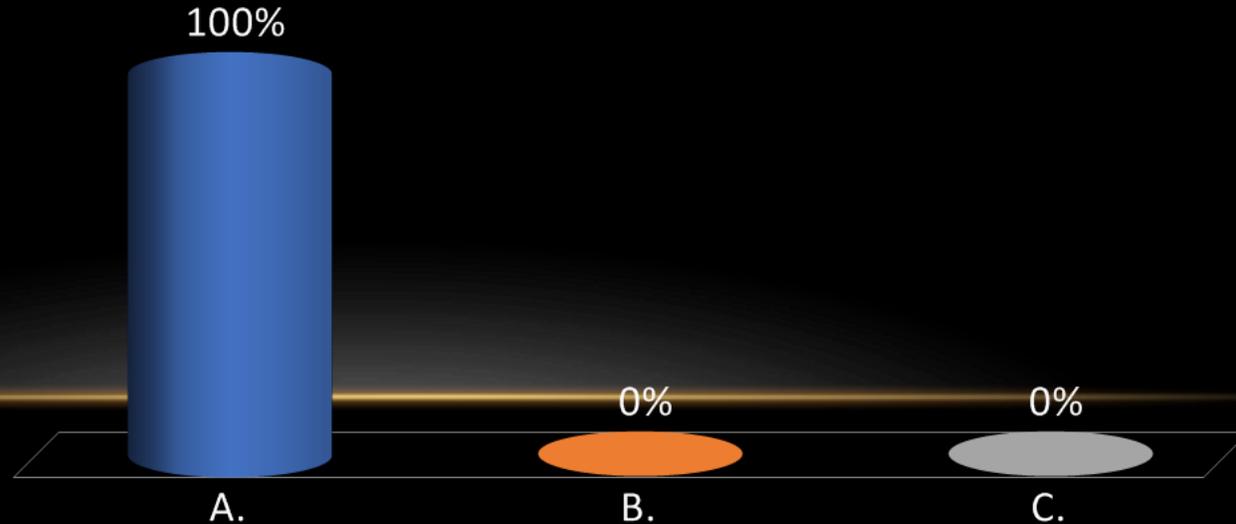
In the absence of a sinus tract, elevated inflammatory markers (erythrocyte sedimentation rate [ESR] and C-reactive protein [CRP]) should prompt ankle joint aspiration for cell count, differential, and culture. The joint aspiration is repeated.

If the same organism is identified in at least two cultures of synovial fluid, the patient is diagnosed to have infection. If the repeat aspiration is negative, further investigation is warranted.

In patients not requiring surgical intervention for other reasons, nuclear imaging should be considered for diagnosis. If operation is indicated, histologic examination (>5 neutrophils/high-power field) or synovial fluid analysis is conducted to confirm infection.

Level of Evidence: Limited

- A. Agree
- B. Disagree
- C. Abstain



F-15 (Former F- 41) What tests are useful to investigate a possible infection of total ankle arthroplasty? What are their thresholds?

RESEARCHED BY:



Uçkay, Ilker MD, Switzerland



Pedowitz, David MD, USA



Literature:

- ***Meta-analysis/Systematic Review 1**
- ***Prospective/Randomized 0**
- ***Retrospective 7**

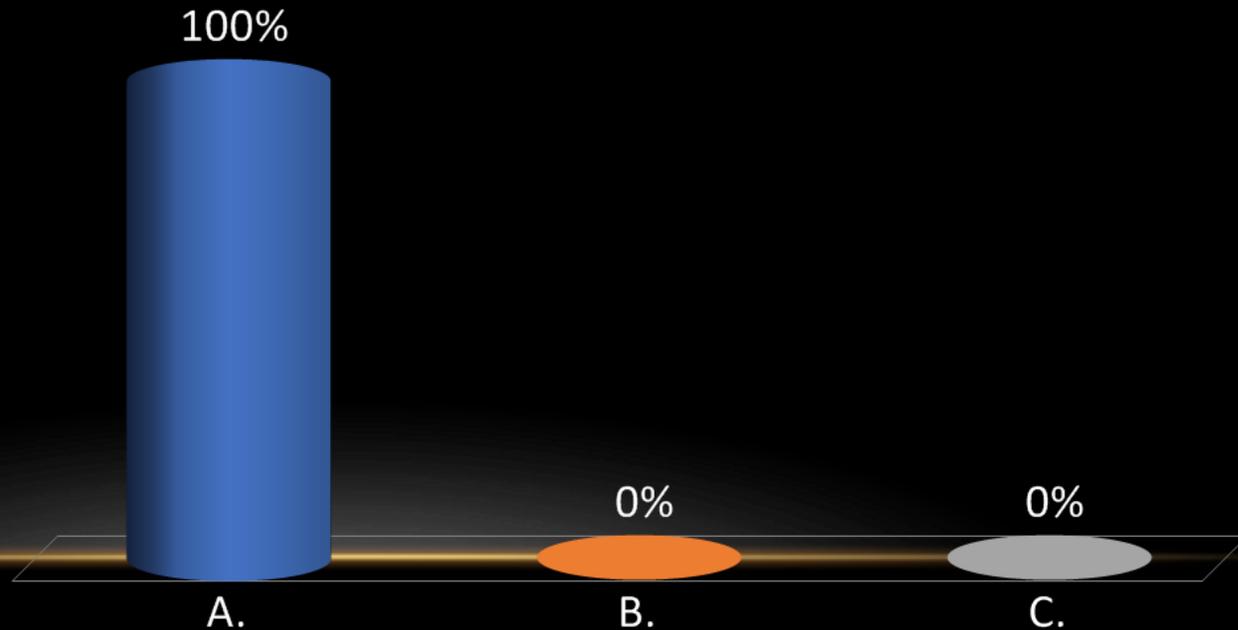
***Evidence for use of joint aspiration, or intraoperative tissue/synovial biopsies, with microbiological techniques in work-up of PJI, though not specific to total ankle arthroplasty; defined thresholds are lacking**



Recommendation: Overall, the approach to a potentially infected total ankle arthroplasty (TAA) does not change compared to other PJI. There are no novel or unique diagnostic procedures for TAA infection, specifically. Joint aspiration, or intraoperative tissue/synovial biopsies, with microbiological cultures are the most important diagnostic tests for suspected TAA infections. In the absence of specific data related to TAA, the threshold for these tests should be derived from the hip and knee PJI literature.

Level of Evidence: Strong

- A. Agree
- B. Disagree
- C. Abstain



F-16 (Former F- 19) What are the indications for aspiration of a possibly infected total ankle arthroplasty?

RESEARCHED BY:



Aiyer, Amiethab MD, USA



Plöger, Milena M MD, Germany

Literature:

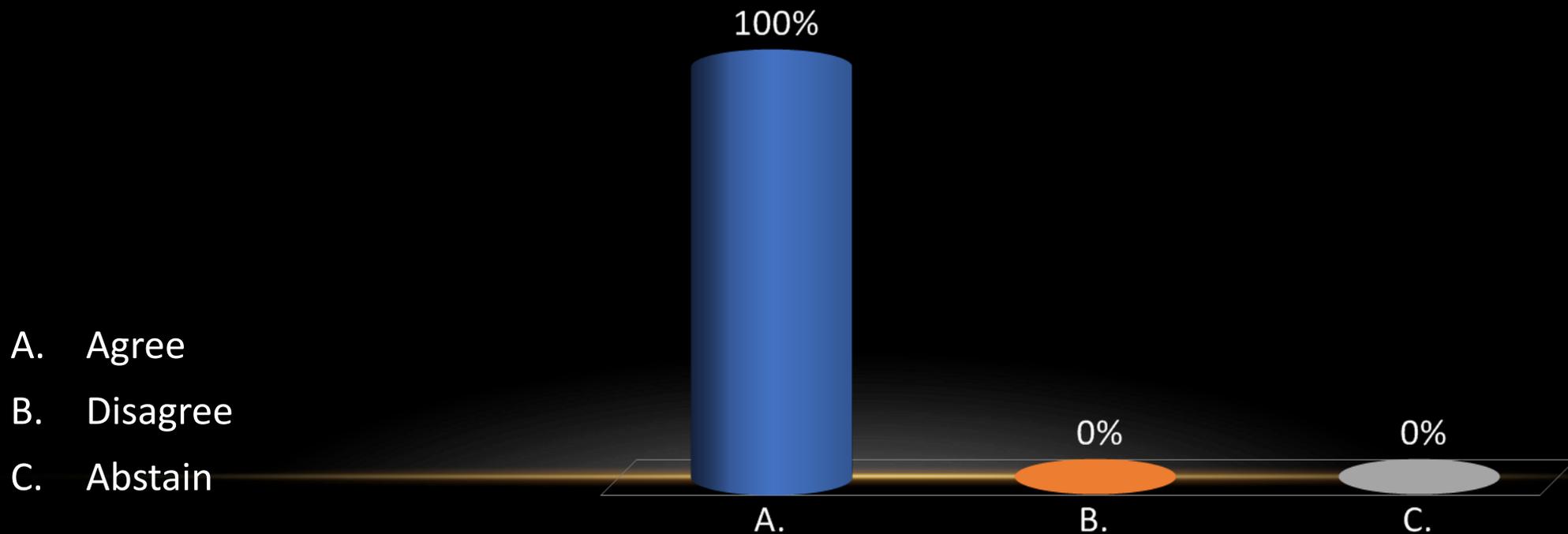
- ***Meta-analysis/Systematic Review 1**
- ***Prospective/Randomized 0**
- ***Retrospective 4**

***Lack of evidence for indication of aspiration for potentially infected total ankle arthroplasty, though indicators and thresholds are well-studied and defined in hip and knee arthroplasty literature**

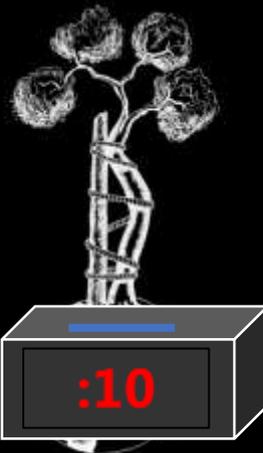


Recommendation: Whenever a periprosthetic joint infection (PJI) of a TAA is clinically possible or suspected, especially when elevated erythrocyte sedimentation rate or C-reactive protein levels exist, which in correspondence to the literature on PJI in total hip and knee arthroplasties, includes joint aspiration.

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-17 (Former F-24) What is the best technique for performing aspiration of patients with TAA?

RESEARCHED BY:



Shakked, Rachel MD, USA



Literature:

- ***Meta-analysis/Systematic Review 1**
- ***Prospective/Randomized 0**
- ***Retrospective/Cadaveric 8**

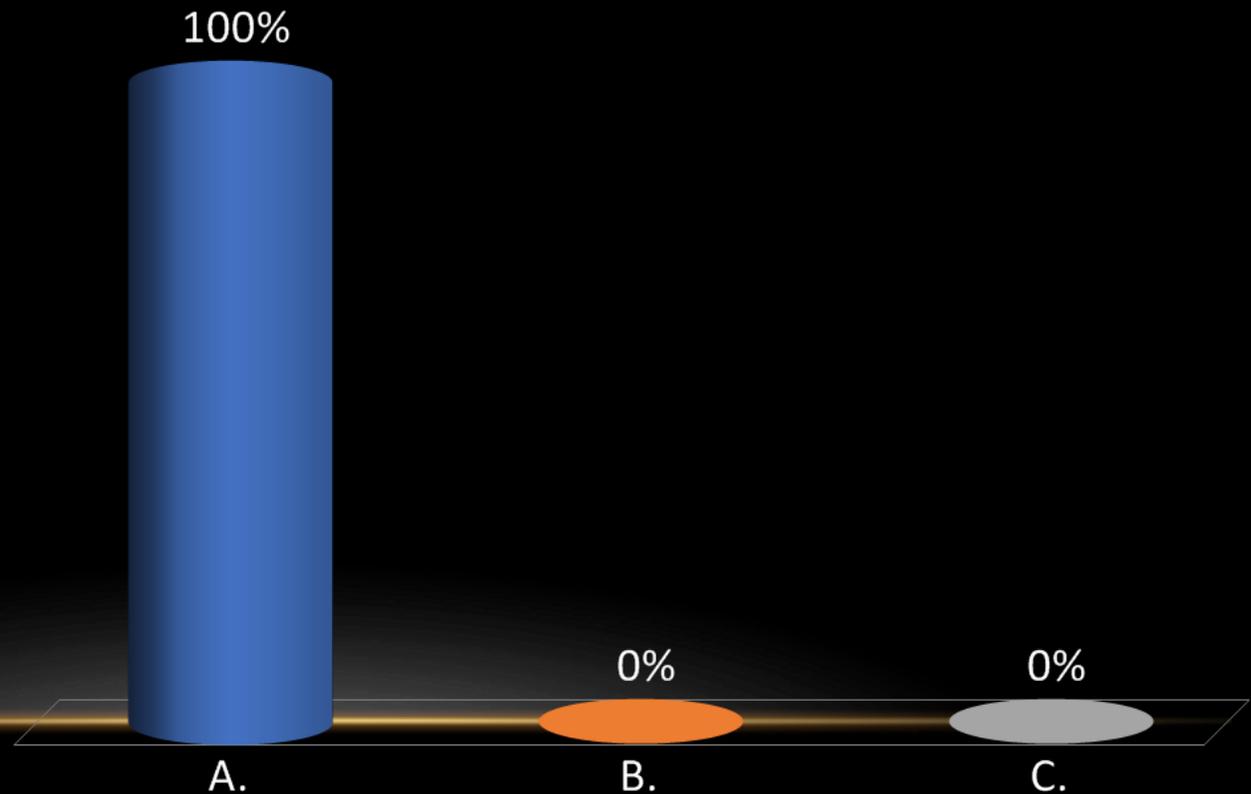
***Lack of evidence for a best technique for performing aspiration of ankle joint; conflicting evidence for the use of imaging guidance during aspiration**



Recommendation: In the absence of evidence, we recommend that ankle joint aspiration to evaluate for periprosthetic joint infection be performed under sterile conditions via the anteromedial approach. Ultrasound guidance may be used if available but is not necessary to obtain an acceptable synovial fluid sample.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-18 (Former F- 11) Should aspiration of the ankle with an antibiotic spacer be performed prior to reimplantation?

RESEARCHED BY:



Fuchs, Daniel MD, USA



Parekh, Selene MD, USA



Literature:

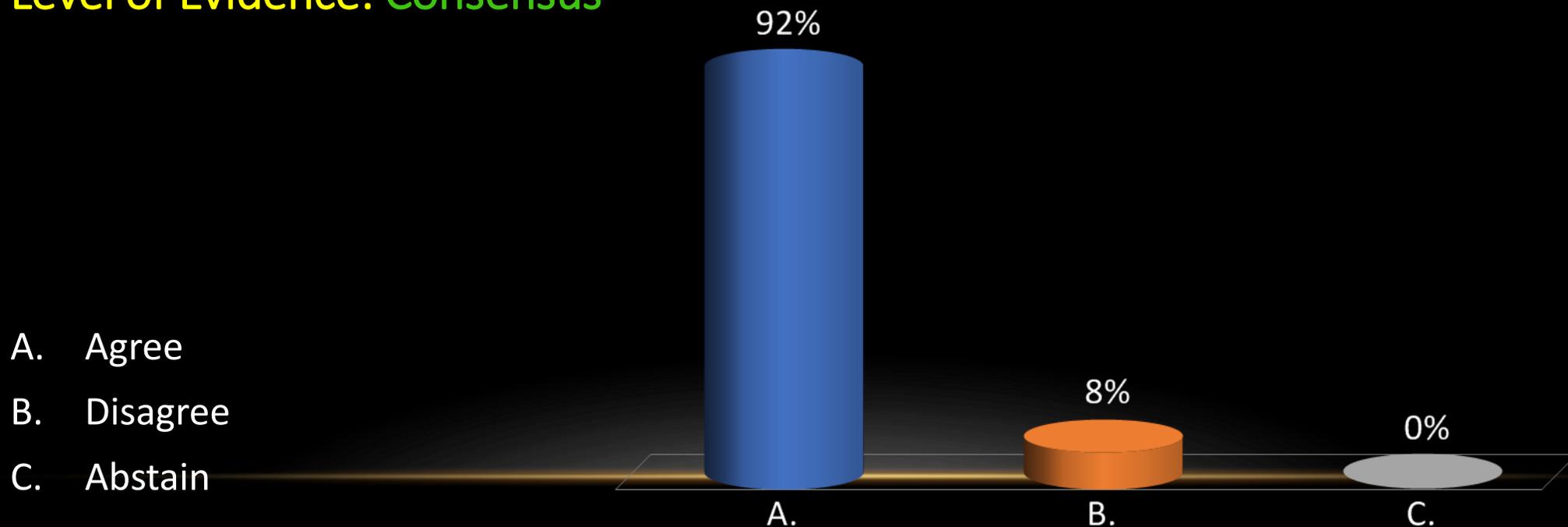
- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 12**

***Lack of evidence in the total ankle arthroplasty (TAA) literature evaluating the utility of aspiration of an antibiotic spacer as part of a two-stage revision for infected total ankle arthroplasty; non-uniform evidence in total hip and knee arthroplasty literature**

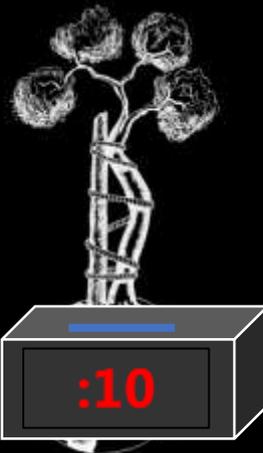


Recommendation: We recommend that aspiration of the ankle with an antibiotic spacer prior to a second stage reimplantation be strongly considered. Available studies indicate that a positive culture of the aspirate in this setting is predictive of residual infection, while a negative aspirate culture does not rule out infection and should be interpreted in light of other clinical indicators and laboratory values.

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-19 (Former F- 7) Is there a role for measuring synovial biomarkers for diagnosis of infected total ankle arthroplasty?

RESEARCHED BY:



Emara, Khaled J MD, Egypt



Embil, John M MD, Canada



Literature:

- ***Meta-analysis/Systematic Review 3**
- ***Prospective/Randomized 0**
- ***Retrospective 15**

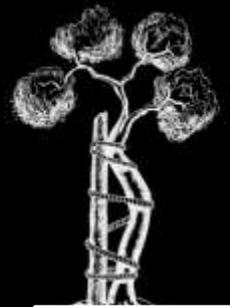
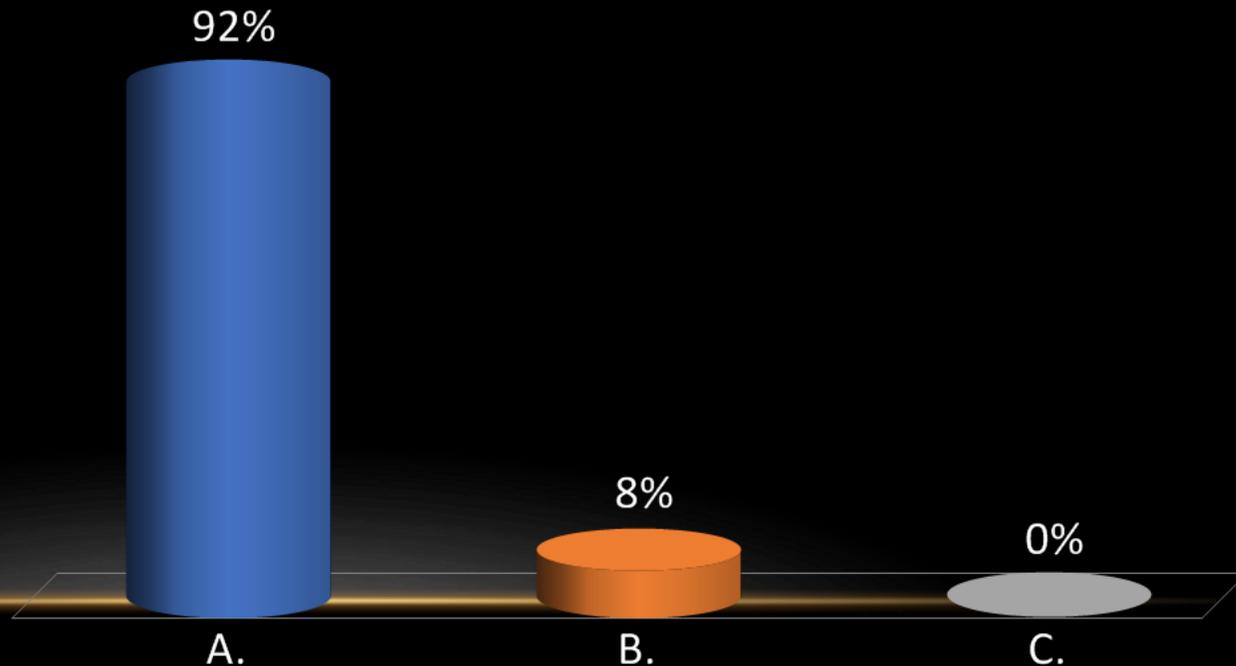
***Lack of evidence on role of synovial biomarker measurements in diagnosis of total ankle arthroplasty infection, though evidence exists in diagnosis of infection in other joints**



Recommendation: Based on the hip and knee arthroplasty literature, measuring synovial biomarkers may play a role in the diagnosis of infected total ankle arthroplasty (TAA). The diagnosis of periprosthetic joint infection (PJI) in the setting of a TAA can be confirmed with cultures, provided that a plausible pathogen is recovered in the context of a compatible clinical picture. In the absence of a positive culture, synovial biomarker analysis may help in establishing the diagnosis.

Level of Evidence: Moderate

- A. Agree
- B. Disagree
- C. Abstain



F-20 (Former F- 33) What is the role of molecular techniques for detection of pathogen DNA (PCR or Next generation sequencing) in patients with infected total ankle arthroplasty?

RESEARCHED BY:



Emara, Khaled J MD, Egypt



Aiyer, Amiethab MD, USA



Literature:

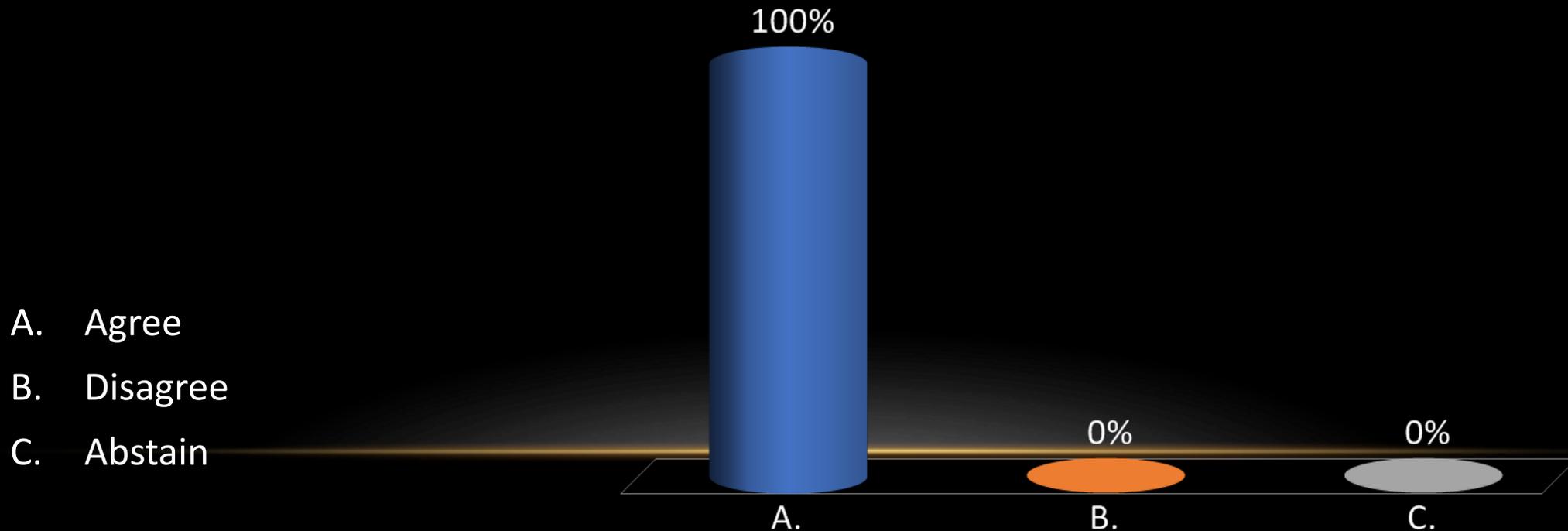
- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 1**
- ***Retrospective 22**

***Lack of clinical evidence for role of molecular techniques in total ankle arthroplasty patients**

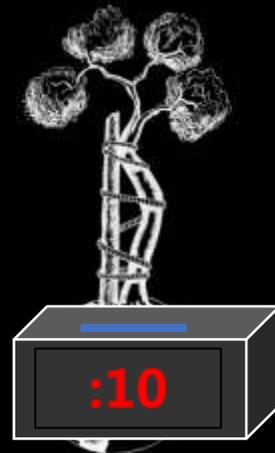


Recommendation: Molecular techniques, in particular next-generation sequencing and the Ibis T5000 technology, have the potential to be used as an important adjunct in the diagnosis of bacterial infection following total ankle arthroplasty, although sufficient clinical evidence is lacking.

Level of Evidence: Limited



- A. Agree
- B. Disagree
- C. Abstain



F-21 (Former F- 12) Should culture samples be taken during all revision total ankle arthroplasty?

RESEARCHED BY:



Fuchs, Daniel MD, USA



Literature:

- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 6**

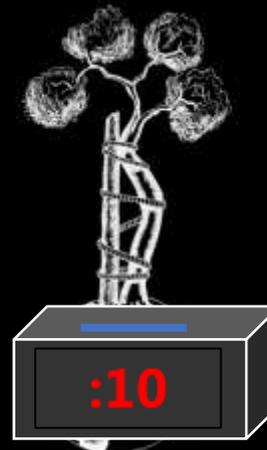
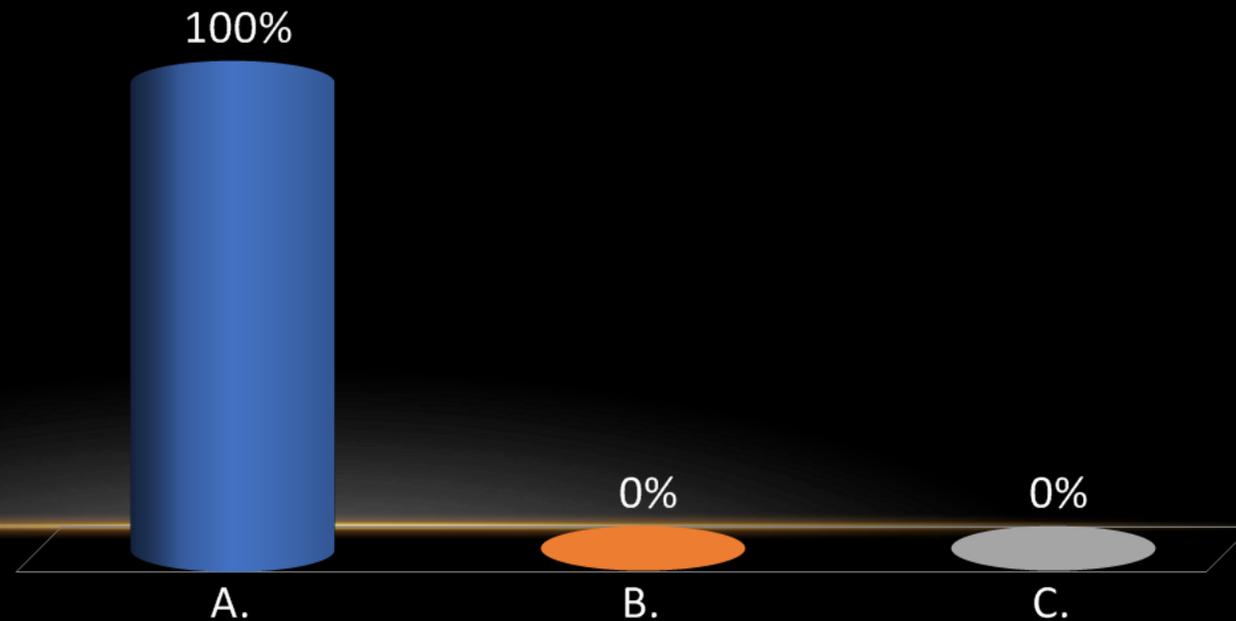
***Lack of evidence for use routine intraoperative cultures during revision total ankle arthroplasty; strong evidence for taking culture samples in hip and knee arthroplasty literature**



Recommendation: We recommend that intraoperative culture samples be taken during revision total ankle arthroplasty (TAA). The result of intraoperative cultures should be interpreted together with clinical suspicion for infection and the results of the laboratory and imaging investigations. We recommend that multiple tissue specimens be collected. Given a lack of evidence for routine intraoperative cultures for revision total ankle arthroplasty, this recommendation is based on analogous evidence in the total hip and knee replacement literature.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-22 (Former F- 31) What is the optimal number of samples for culture in patients undergoing surgery for foot and ankle infections?

RESEARCHED BY:



Tanaka, Yasuhito MD, Japan



Aiyer, Amiethab MD, USA



Literature:

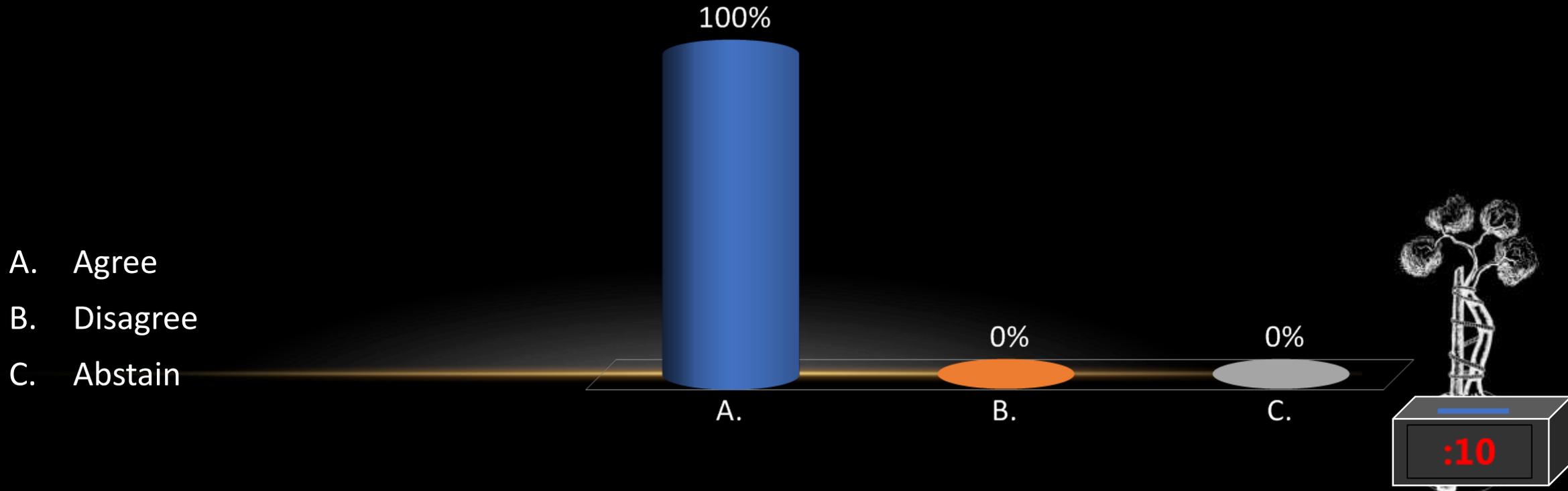
- ***Meta-analysis/Systematic Review 1**
- ***Prospective/Randomized 2**
- ***Retrospective 2**

***Limited evidence guiding the number of samples necessary to obtain for foot and ankle infections**



Recommendation: The optimal number of samples for culture in patients undergoing surgery for foot and ankle infections is unknown. We recommend that multiple tissue samples be taken.

Level of Evidence: Consensus



F-23 (Former F- 40) What strategies can be implemented to help isolate the causative organism in patients with infection of the foot and ankle?

RESEARCHED BY:



Ellington, Kent MD, USA



Raikin, Steven MD, USA



Literature:

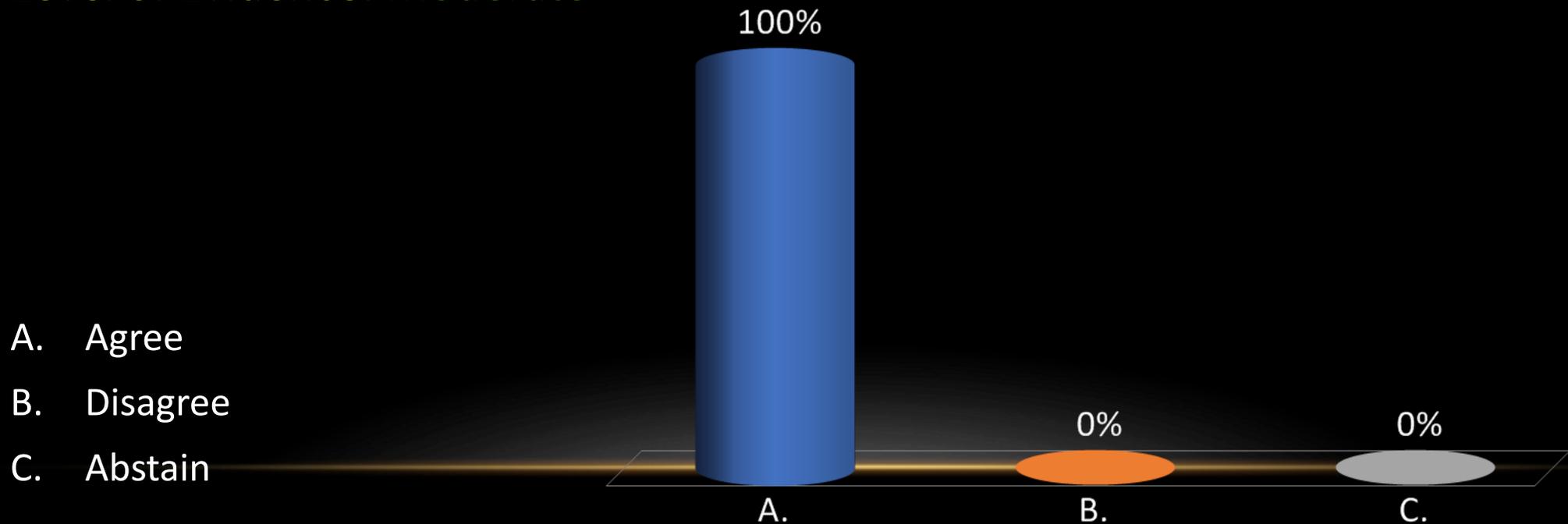
- ***Meta-analysis/Systematic Review 7**
- ***Prospective/Randomized 3**
- ***Retrospective 45**

***Limited evidence on improving the yield of culture in foot and ankle infections, though strong evidence exists in hip and knee arthroplasty literature**

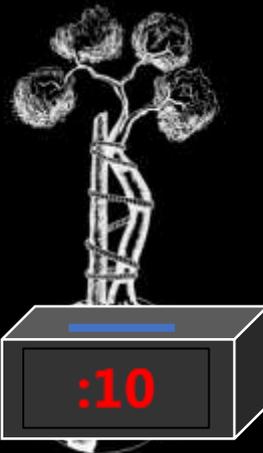


Recommendation: Transfer of synovial aspirate in blood culture bottles, obtaining deep biopsy of tissues and bone, obtaining multiple samples, increasing incubation period of cultures, and the use of molecular techniques for culture negative cases are some of the strategies that can help improve the ability to isolate the causative organism(s) in infections of foot and ankle.

Level of Evidence: Moderate

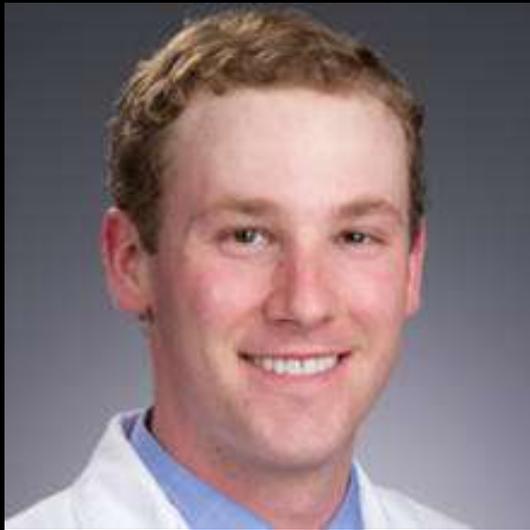


- A. Agree
- B. Disagree
- C. Abstain



F-24 (Former F- 30) What is the optimal method to perform bone biopsy (method, location, imaging use) for patients with foot and ankle infections?

RESEARCHED BY:



O'Neil, Joseph T MD, USA



Literature:

- ***Meta-analysis/Systematic Review 3**
- ***Prospective/Randomized 0**
- ***Retrospective 9**

***Limited evidence for optimal method of bone biopsy in foot and ankle, though a percutaneous method with imaging guidance is a generally preferred method**

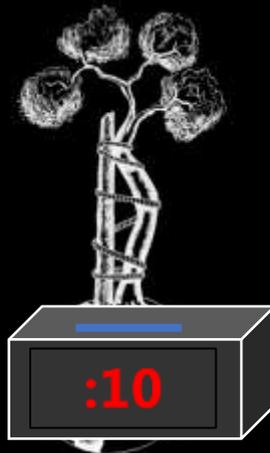
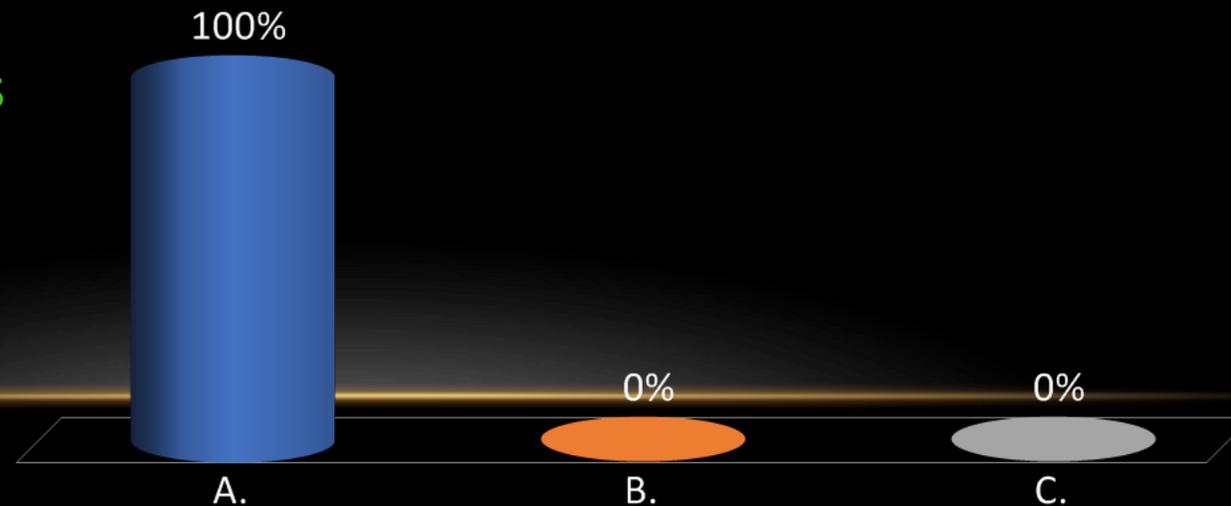


Recommendation:

- A bone biopsy should generally be performed in a percutaneous fashion, particularly in cases where surgical debridement is not considered necessary.
- If surgical debridement is considered necessary, then an open biopsy can be performed as part of the debridement.
- Percutaneous biopsy should be performed under sterile conditions by an interventional radiologist or other physician trained on image-guided techniques.
- The location of the biopsy will depend upon the clinical and radiographic evaluations, with a goal of maximizing the yield of the biopsy while minimizing the risk of injury to surrounding and/or overlying soft tissue structures.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-25 (Former F- 23) What is the best method to differentiate acute Charcot foot from acute infection?

RESEARCHED BY:



Heidari, Nima MD, UK



Oh, Irvin MD, USA



Literature:

- ***Meta-analysis/Systematic Review 8**
- ***Prospective/Randomized 1**
- ***Retrospective 34**

***Limited evidence for differentiation methods, including a targeted history and physical examination, laboratory testing, histological examination and culturing of bone specimens, and diagnostic imaging**

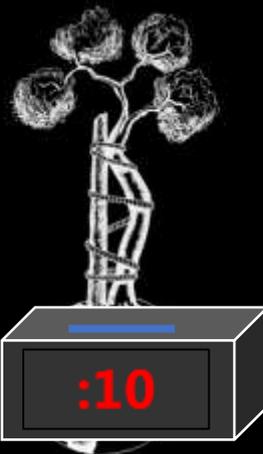
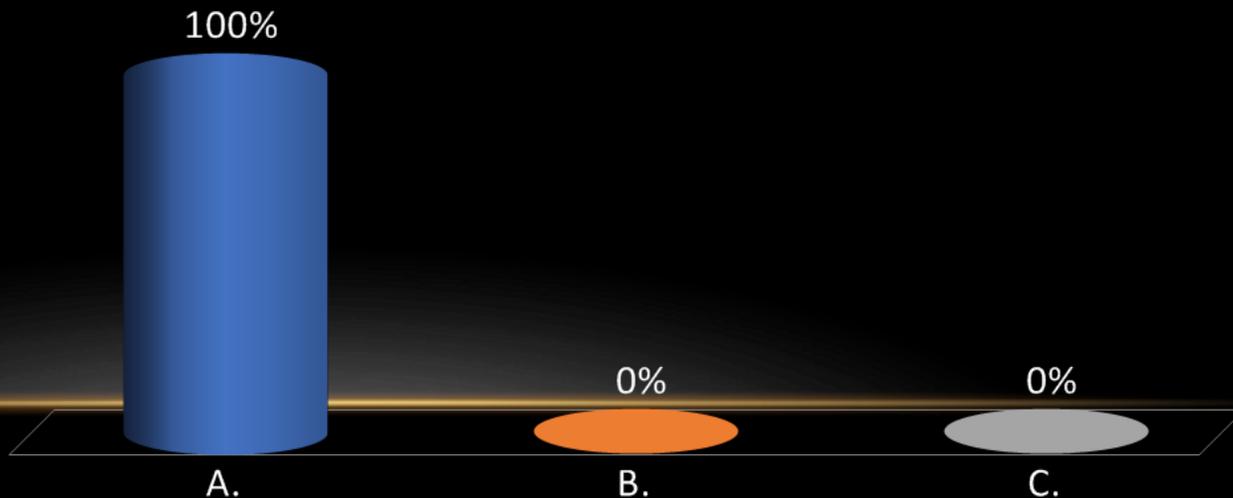


Recommendation: Differentiation between acute Charcot neuroarthropathy and acute infection/osteomyelitis is complex and requires multiple (>1) diagnostic criteria. This includes an emphasis on presence of neuropathy, history, and physical examination. The absence of skin wounds and resolution of swelling/erythema with elevation makes the likelihood of infection very low.

In unclear cases, laboratory testing, histological examination and culturing of bone specimens, scintigraphy, and imaging, especially magnetic resonance imaging (MRI) may be of benefit.

Level of Evidence: Moderate

- A. Agree
- B. Disagree
- C. Abstain



Treatment



F-26 (Former F- 36) What is the treatment "algorithm" for an infected total ankle arthroplasty?

RESEARCHED BY:



Raikin, Steven MD, USA



Parekh, Selene MD, USA



Literature:

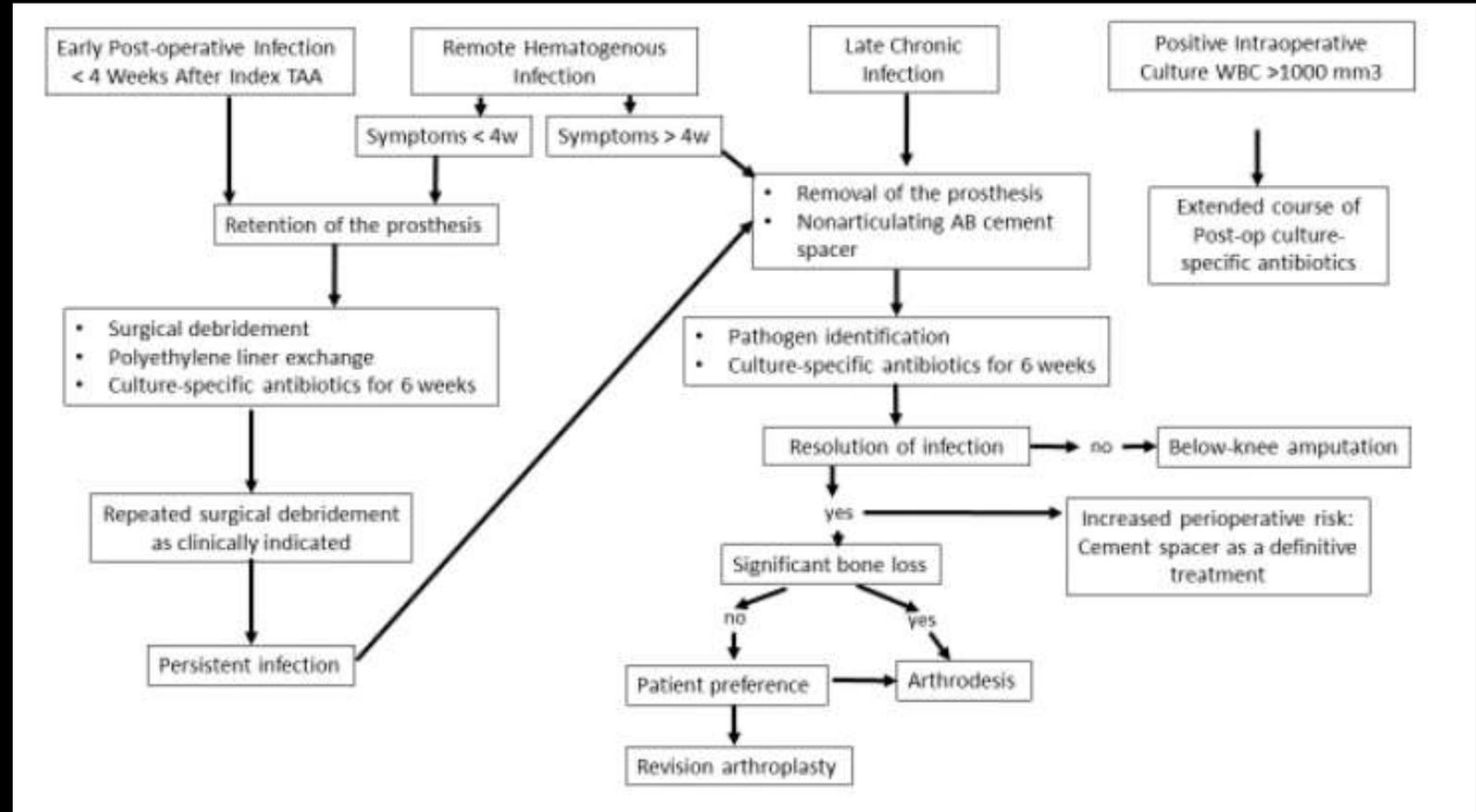
- ***Meta-analysis/Systematic Review 2**
- ***Prospective/Randomized 2**
- ***Retrospective 22**

***Limited evidence for treatment of infected total ankle arthroplasty (TAA) based upon the time of presentation after index TAA and the duration of infection symptoms.**

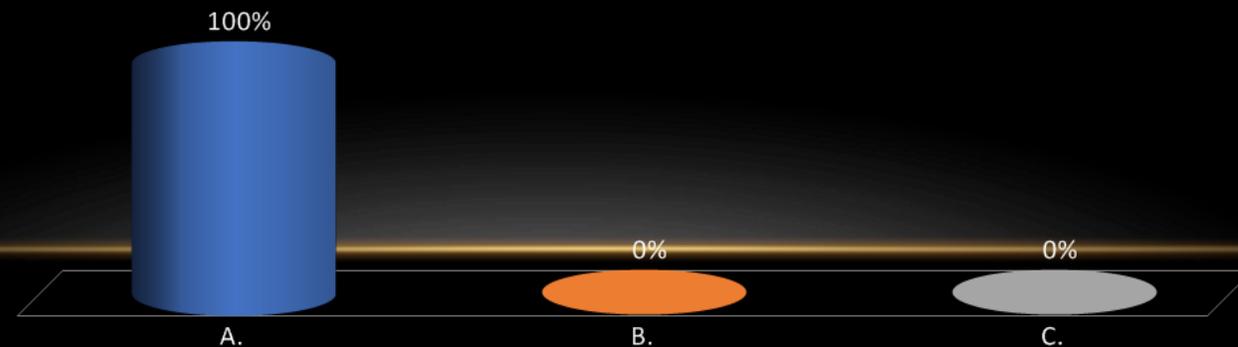


Recommendation: The treatment of an infected total ankle arthroplasty (TAA) is largely dictated by the acuity of the infection. The following treatment algorithm modified for TAA is recommended (Segawa et al.).

Level of Evidence: Limited



- A. Agree
- B. Disagree
- C. Abstain

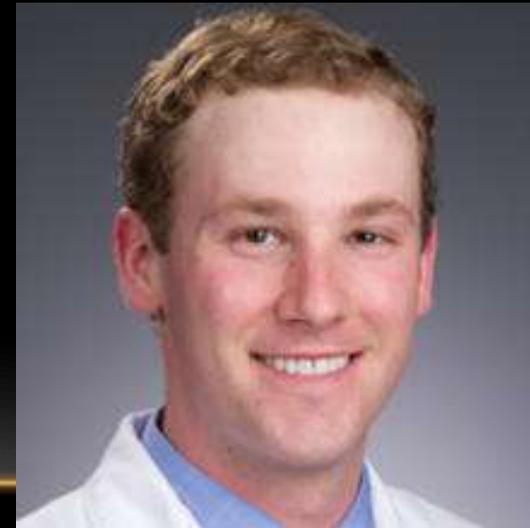


F-27 (Former F- 27) What is the optimal (type, dose and route of administration) antibiotic treatment for patients with infected total ankle arthroplasty?

RESEARCHED BY:



Embil, John M MD, Canada



O'Neil, Joseph T MD, USA



Literature:

- ***Meta-analysis/Systematic Review 4**
- ***Prospective/Randomized 1**
- ***Retrospective 8**

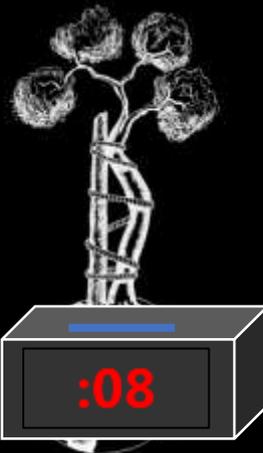
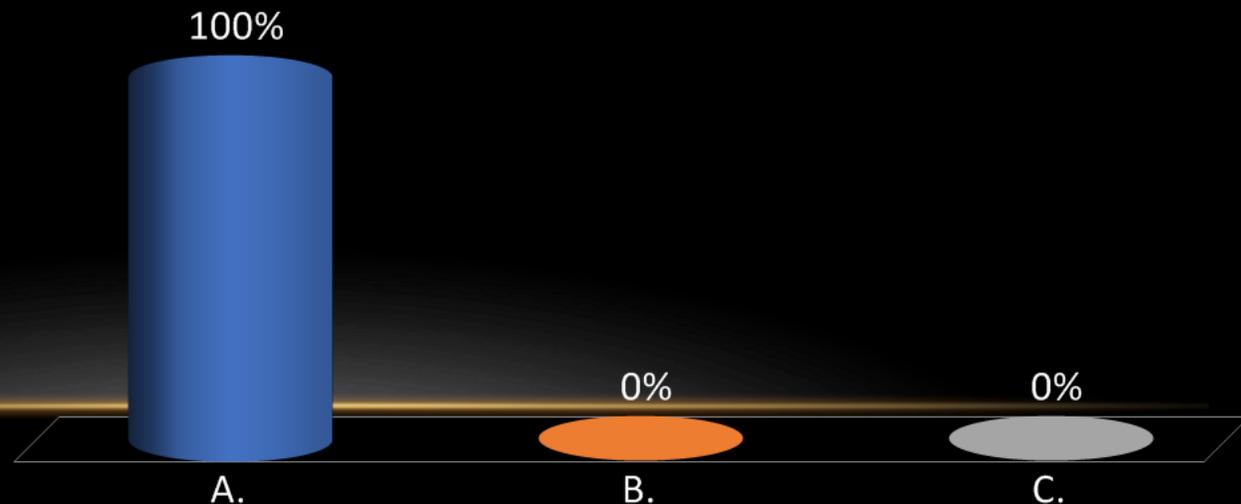
***Lack of evidence for optimal treatment of infected total ankle arthroplasty, with specific recommendations existing for management of hip and knee arthroplasty infections**



Recommendation: Though literature specific to total ankle arthroplasty is lacking, based off recommendations for the management of hip and knee arthroplasties, the choice of antibiotic should be made based on the identification and sensitivities of the infecting organism(s). Dosing, frequency, and route of administration of antibiotics may be determined in consultation with an infectious disease specialist and taking into account the patient's weight, co-morbidities, such as renal impairment, and the antibiogram.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-28 (Former F- 8) Is there a role for suppressive antibiotics in patients with PJI of total ankle arthroplasty who have undergone surgical treatment?

RESEARCHED BY:



Parekh, Selene MD, USA



Literature:

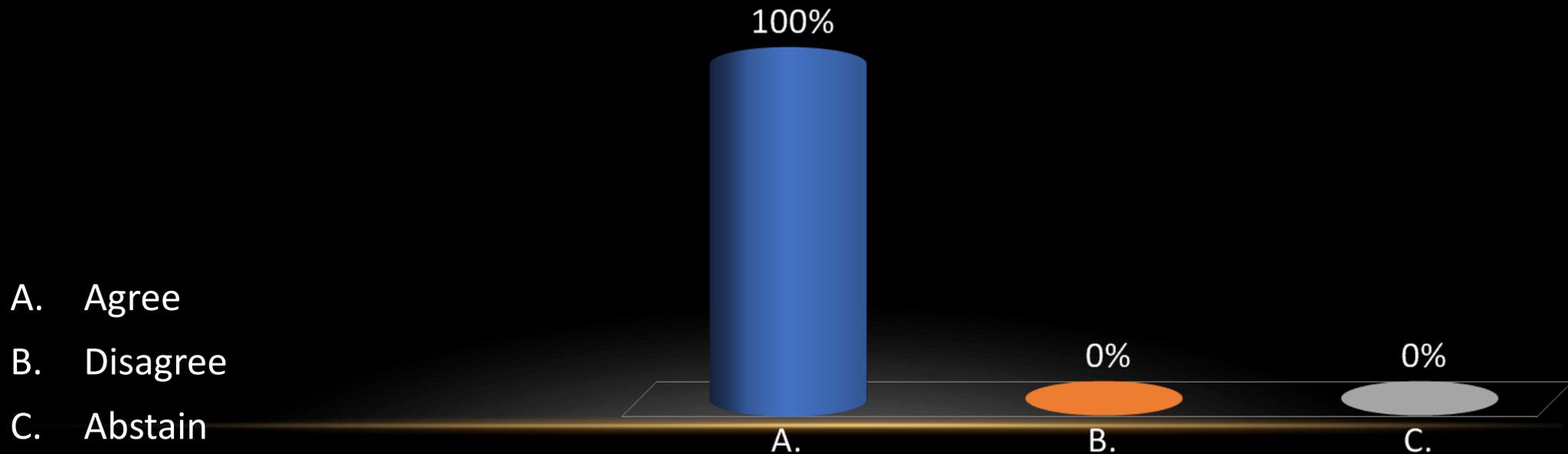
- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 1**
- ***Retrospective 2**

***Lack of evidence addressing a role for suppressive antibiotic therapy after infected total ankle arthroplasty**

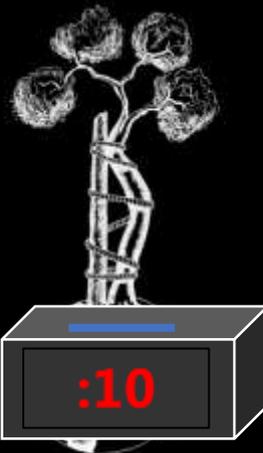


Recommendation: Culture-directed antibiotic therapy is recommended for patients undergoing surgical treatment of infected total ankle arthroplasty (TAA). Routine administration of suppressive antibiotics in patients with an ankle prosthesis in place is not warranted, however, in certain clinical circumstances this may be of benefit.

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-29 (Former F- 22) What determines the type and dose of antibiotic that is needed to be added to the cement spacer in patients with infected total ankle arthroplasty?

RESEARCHED BY:



Shakked, Rachel MD, USA



Da Rin de Lorenzo, Ferdinando MD, Italy



Literature:

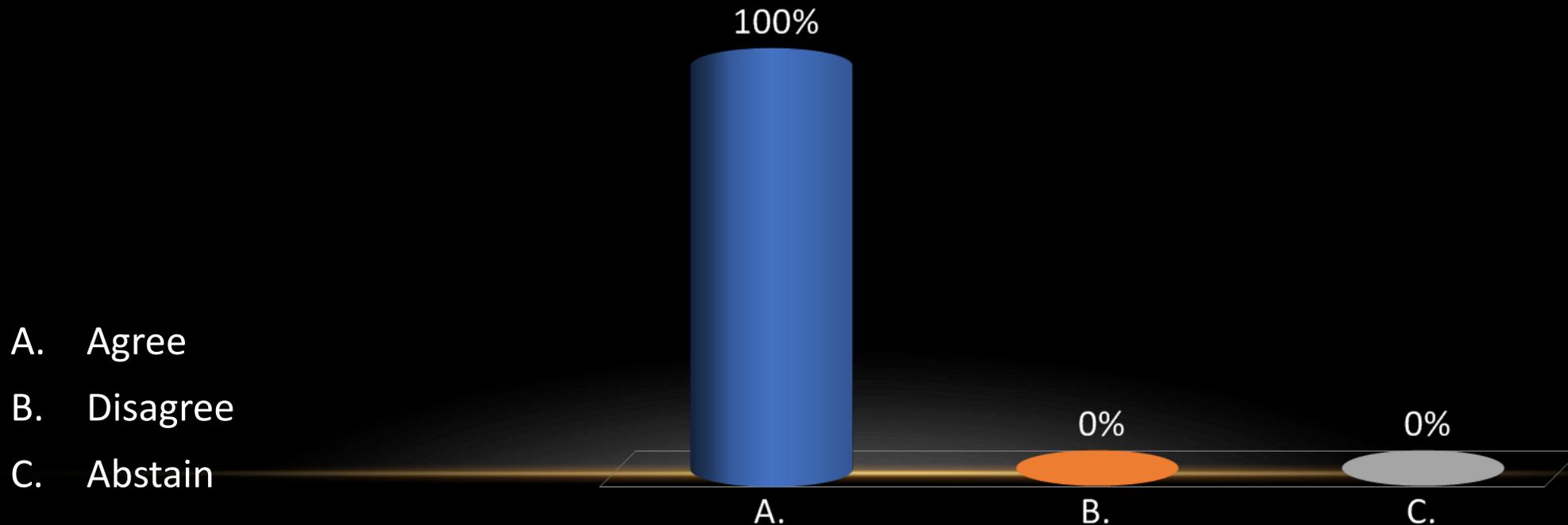
- ***Meta-analysis/Systematic Review 3**
- ***Prospective/Randomized 0**
- ***Retrospective 45**

***Limited evidence on antibiotic regimens added to cement spacers in infected total ankle arthroplasty, with a wide variety of regimens reported in infections of other joint arthroplasties**

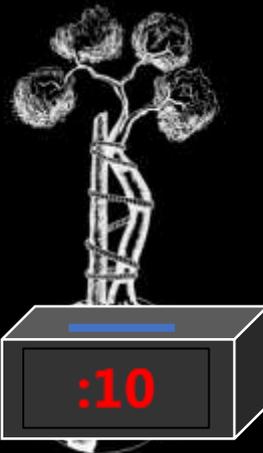


Recommendation: We recommend tailoring the antibiotic in cement spacers to the infecting organism if it has been identified, as is typically done in total knee and hip arthroplasty. Otherwise, broad-spectrum antibiotics may be utilized. Medical comorbidities should always be considered, especially with regard to renal function and allergy profile. A thermostable antibiotic should be used.

Level of Evidence: Consensus



- A. Agree
- B. Disagree
- C. Abstain



F-30 (Former F- 18) What are the indications and contraindications for DAIR (I and D and retention of prosthesis) in patients with infected total ankle arthroplasty?

RESEARCHED BY:



Vulcano, Ettore MD, USA



Literature:

- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 8**

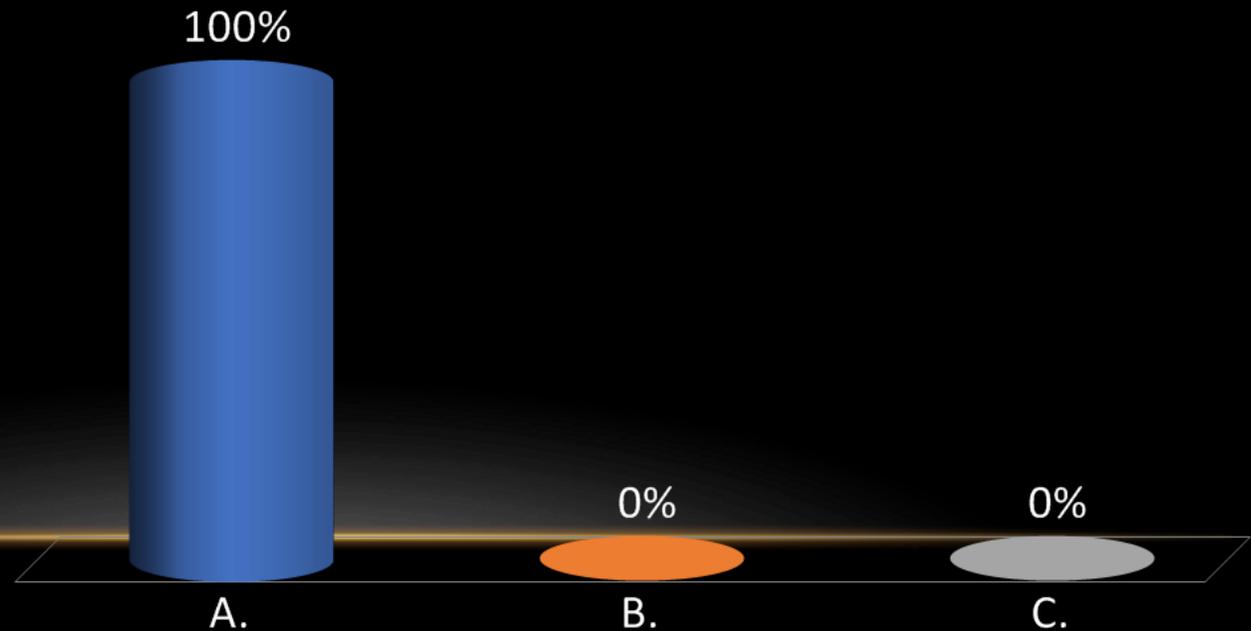
***Lack of evidence guiding DAIR utilization in total ankle arthroplasty; any potential guidelines derived from hip and knee arthroplasty literature**



Recommendation: DAIR (debridement, antibiotics, irrigation, and retention) with polyethylene exchange may be indicated in early postoperative infection (<4 weeks) or acute hematogenous infection (<3 weeks of symptoms) in patients with infected total ankle arthroplasty (TAA), although recurrent infection has been seen. Sufficient clinical evidence is lacking.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-31 (Former F- 32) What is the optimal protocol for performing DAIR in an infected TAA? (type and volume of irrigation solution, and so on)

RESEARCHED BY:



Uçkay, Ilker MD, Switzerland



Pedowitz, David MD, USA



Literature:

- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 8**

***Lack of evidence for optimal protocol for DAIR in an infected total ankle arthroplasty, though meticulous debridement and the use of copious antiseptic solutions are believed to be important parts**



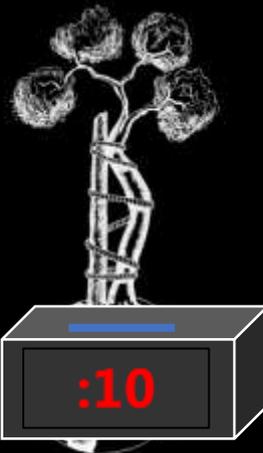
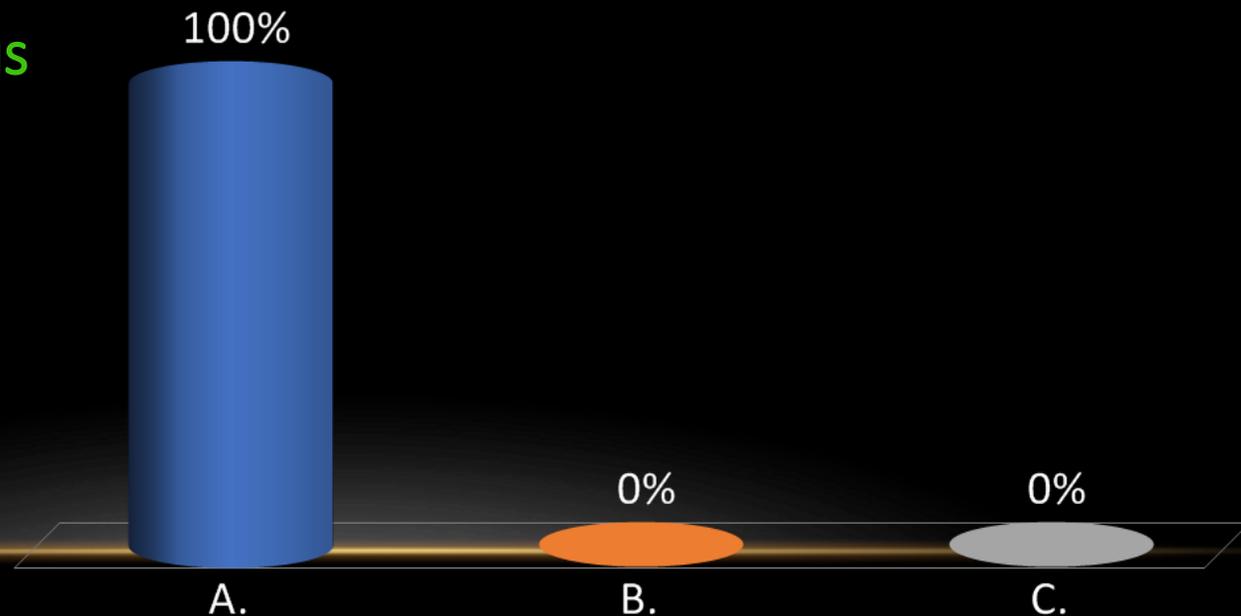
Recommendation: Debridement, antibiotics and implant retention (DAIR) in acute TAA infections may be an acceptable treatment option.

If performed, DAIR should be done meticulously, ensuring that all necrotic or infected tissues are removed, modular parts of the prosthesis, if any, exchanged.

The infected joint should also be irrigated with antiseptic solutions.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-32 (Former F- 20) What are the indications for one-stage versus two-stage exchange arthroplasty in management of the infected total ankle arthroplasty?

RESEARCHED BY:



Ellington, Kent MD, USA



Literature:

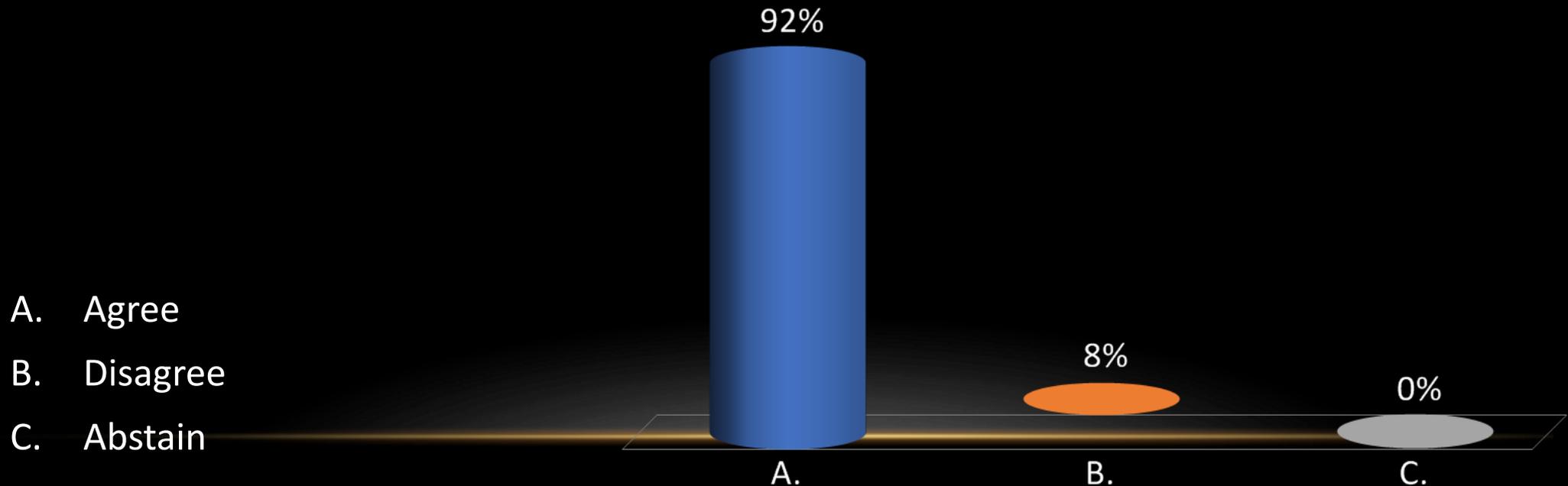
- ***Meta-analysis/Systematic Review 5**
- ***Prospective/Randomized 0**
- ***Retrospective 32**

***Lack of strong evidence regarding indications or contraindications for a one- versus two-stage exchange arthroplasty in infected total ankle arthroplasty**



Recommendation: Two-stage exchange arthroplasty is recommended in the majority of cases following infected TAA. One-stage arthroplasty is only indicated in a limited patient population with acute infection, preoperatively identified low-virulence organisms, and low-risk patient factors.

Level of Evidence: Consensus



F-33 (Former F- 37) What metrics can be used to determine the optimal timing of reimplantation in patients who have undergone resection arthroplasty as part of a two-stage exchange for infected total ankle arthroplasty?

RESEARCHED BY:



Senneville, Eric MD, France



Slullitel, Gaston MD, Argentina



Literature:

- ***Meta-analysis/Systematic Review 6**
- ***Prospective/Randomized 0**
- ***Retrospective 16**

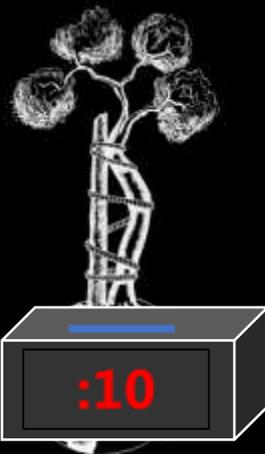
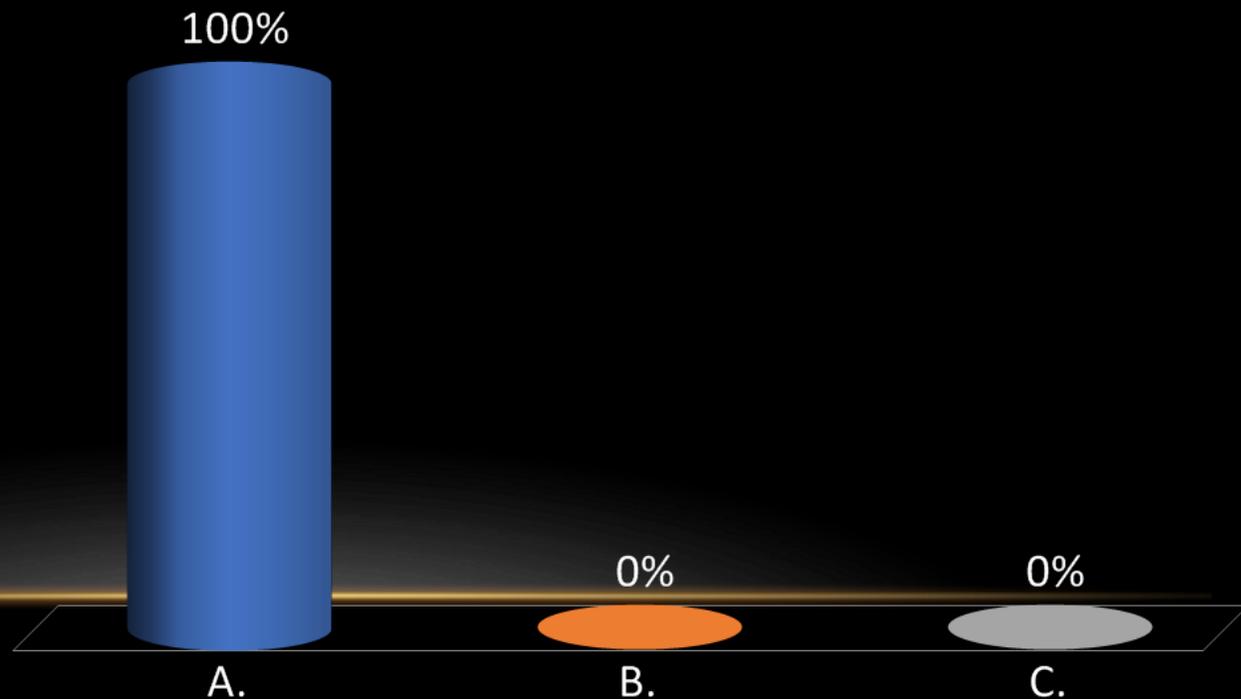
***Lack of evidence regarding what metrics determine the optimal timing of reimplantation for an infected total ankle arthroplasty; any recommendations derived from hip and knee arthroplasty literature**



Recommendation: There is no conclusive data regarding what metrics can be used in order to determine the optimal timing of reimplantation for an infected total ankle arthroplasty. We recommend that reimplantation is performed when there is clinical signs of resolution of infection (well-healed wound, lack of erythema, etc.) and the serological markers have substantially declined (>40%) from baseline (measured at the time of diagnosis of infection).

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-34 (Former F- 21) What are the predictors of treatment failure in patients who have undergone two-stage exchange for infected total ankle arthroplasty?

RESEARCHED BY:



McDonald, Elizabeth BA, USA



Literature:

- ***Meta-analysis/Systematic Review 3**
- ***Prospective/Randomized 2**
- ***Retrospective 10**

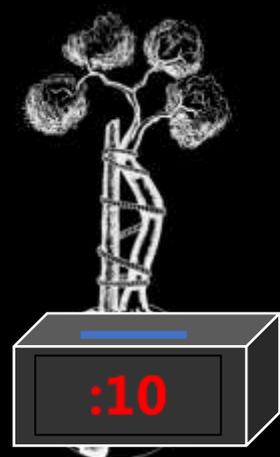
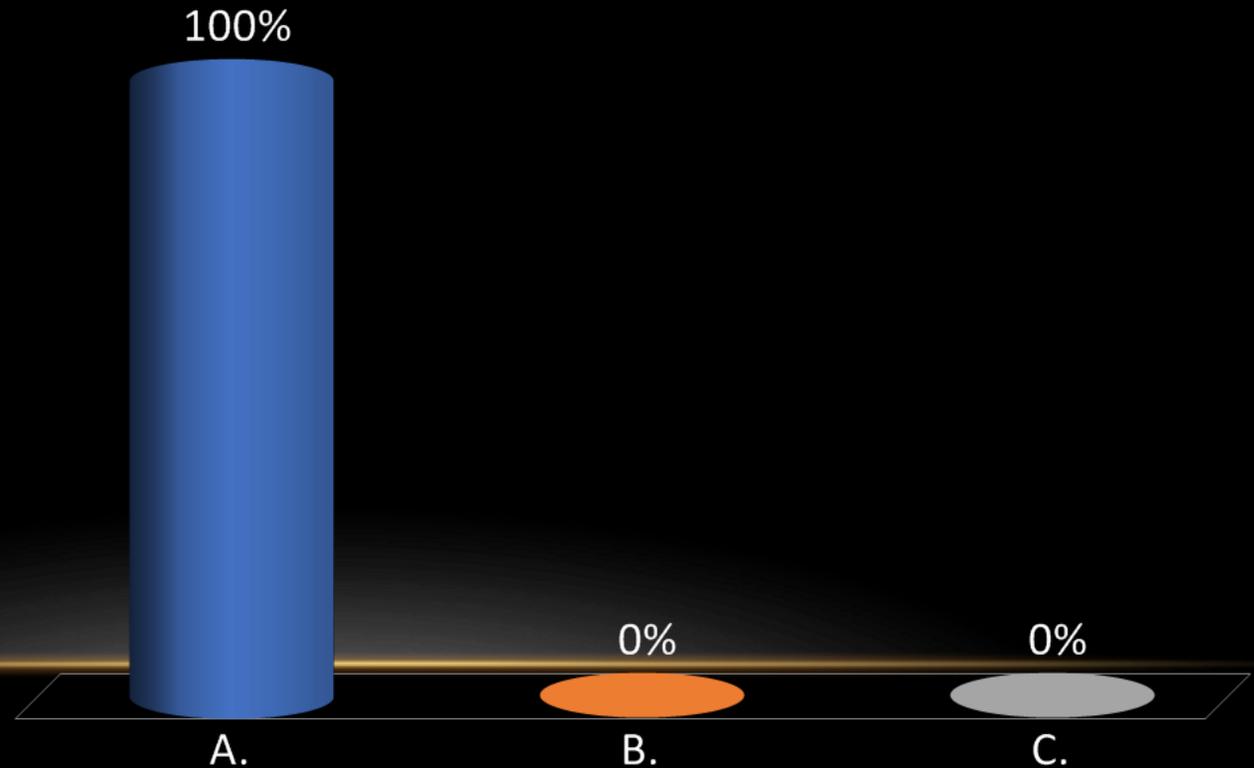
***Limited evidence in the total ankle arthroplasty literature on predictors of two-stage exchange failure, though compromised tissue and inadequate administration of antibiotics are potential causes**



Recommendation: Predictors for treatment failure in patients undergoing two-stage exchange for infected TAA include compromised soft tissues (e.g. sinus tract, exposed hardware, etc.); significant bone involvement/osteomyelitis; and insufficient timing of antibiotic course before reimplantation.

Level of Evidence: Moderate

- A. Agree
- B. Disagree
- C. Abstain



F-35 (Former F- 6) How should postoperative cellulitis be treated in patients with total ankle arthroplasty in place?

RESEARCHED BY:



Plöger, Milena M MD, Germany

Murawski, Christopher D MD, USA



Literature:

- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 4**

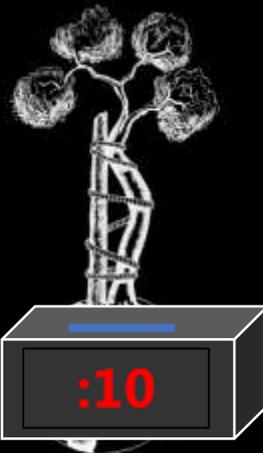
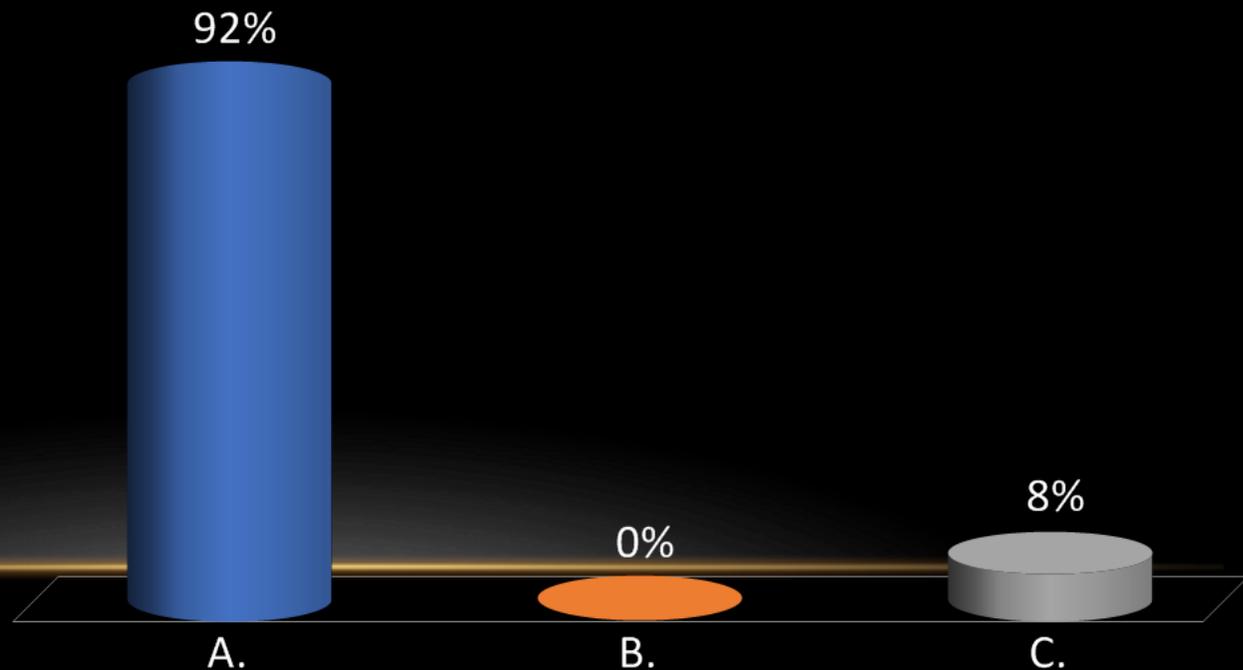
***Lack of evidence regarding management of cellulitis in patients with total ankle arthroplasty, with limited literature in the total hip arthroplasty literature**



Recommendation: In the absence of evidence, we recommend that (1) patients with total ankle arthroplasty in place who develop postoperative cellulitis be evaluated thoroughly to rule out periprosthetic joint infection of the ankle and (2) that isolated cellulitis may be treated with antibiotics, elevation, and close monitoring. Aspiration can be considered in certain cases, with the potential risk of introducing deep space infection.

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-36 (Former F- 2) Does deep chronic infection after total ankle arthroplasty require implant removal?

RESEARCHED BY:



Kaplan, Jonathan MD, USA



Raikin, Steven MD, USA



Literature:

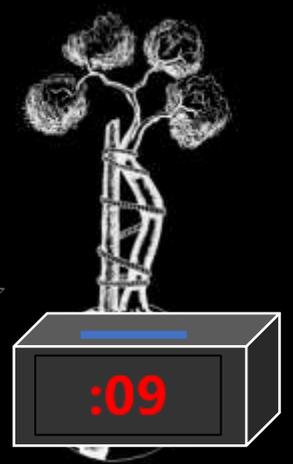
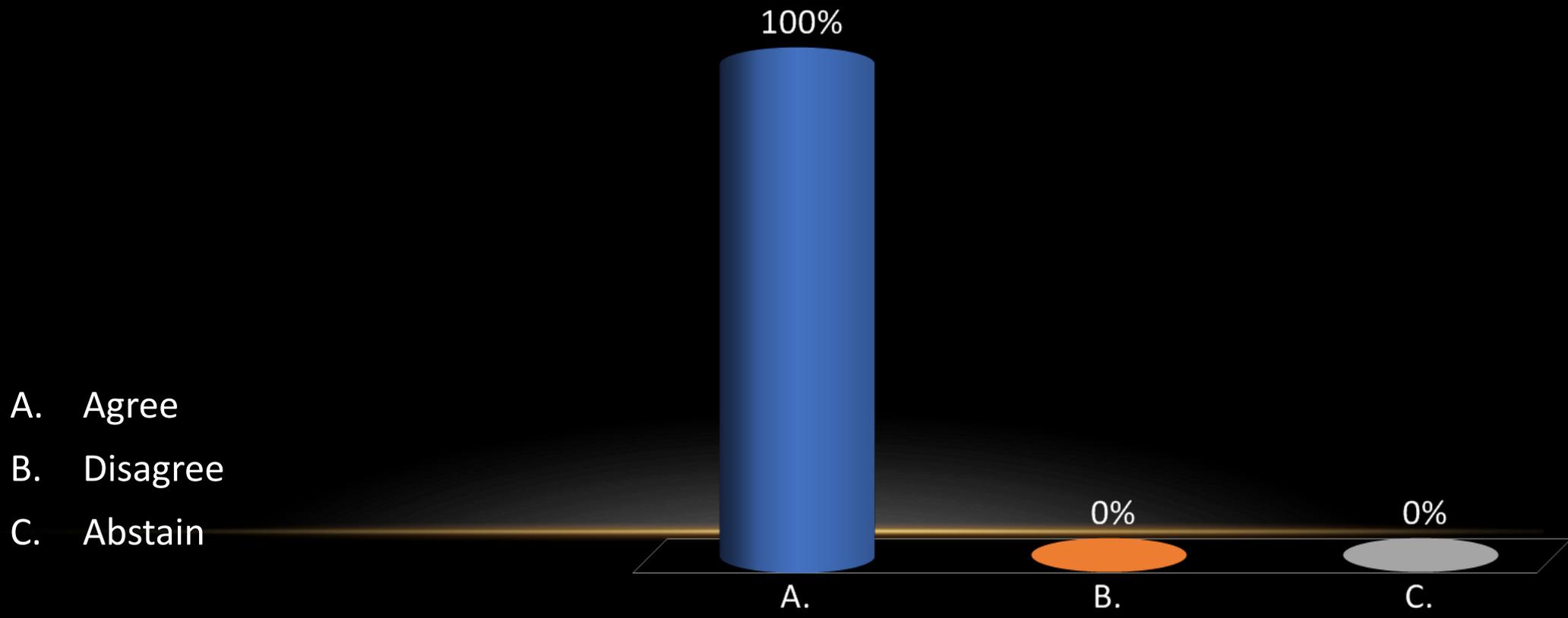
- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 6**

***Limited evidence assessing deep chronic infection in primary total ankle arthroplasty (TAA) and TAA revisions; most recommendations based on the total hip and knee arthroplasty literature rather than studies specifically assessing infected TAA**



Recommendation: Yes. Deep chronic infection after total ankle arthroplasty requires implant removal unless otherwise contraindicated.

Level of Evidence: Strong



F-37 (Former F- 35) What is the treatment "algorithm" for infection after ankle or hindfoot arthrodesis?

RESEARCHED BY:



Ellington, Kent MD, USA



Hirose, Christopher MD, USA

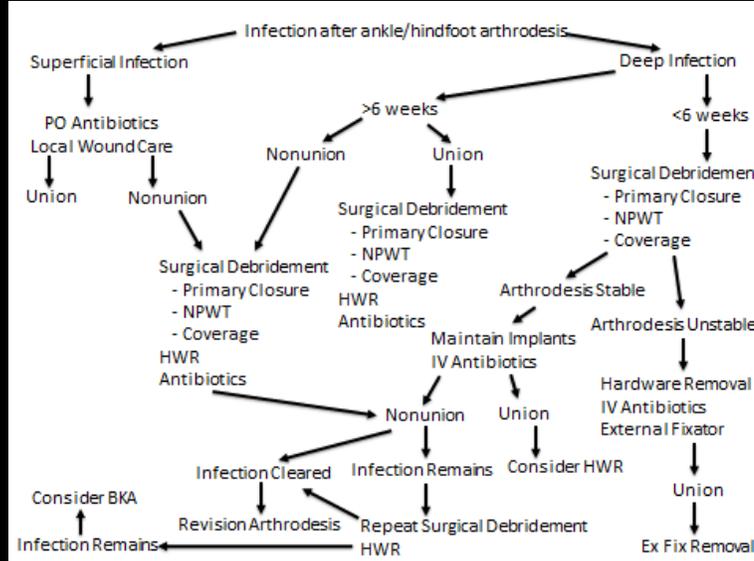


Literature:

- ***Meta-analysis/Systematic Review 11**
 - ***Prospective/Randomized 4**
 - ***Retrospective 70**
- *Lack of evidence for any definite treatment algorithm**



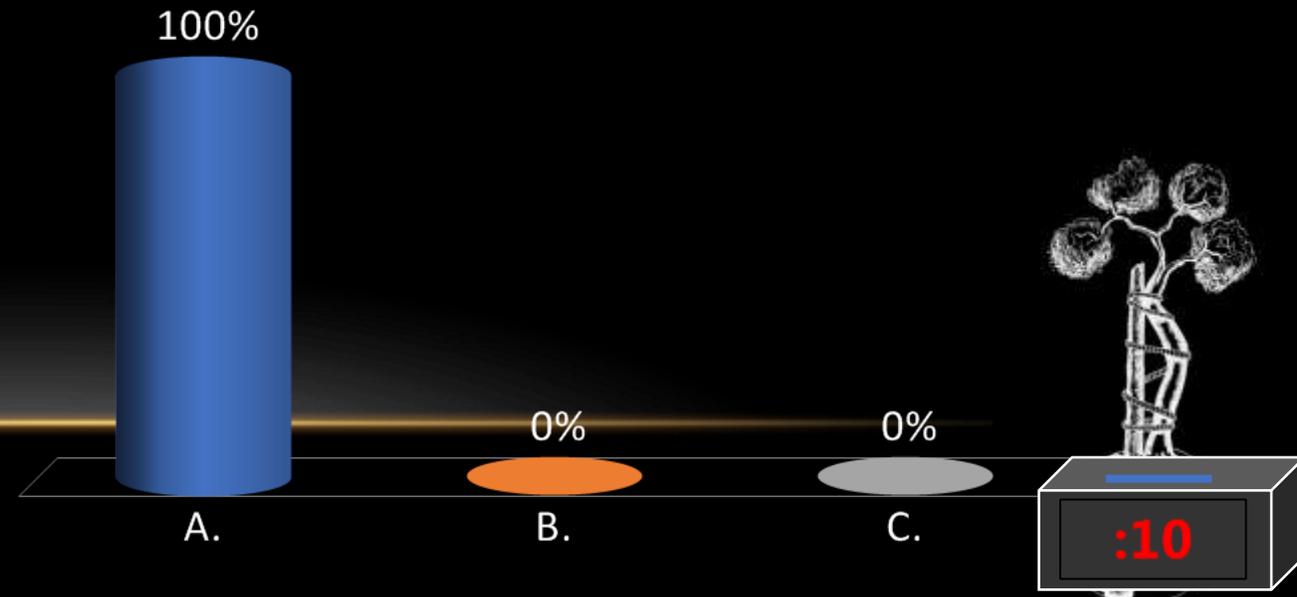
Recommendation: There is no universal algorithm for addressing the infected ankle or subtalar arthrodesis. A potential algorithm created by consensus is:



NPWT: Negative Pressure Wound Therapy
HWR: Hardware Removal
BKA: Below-Knee Amputation

Level of Evidence: Consensus

- A. Agree
- B. Disagree
- C. Abstain



F-38 (Former F- 28) What is the optimal antibiotic (type, dose and route of administration) treatment for infections after foot/ankle fracture or fusion procedures?

RESEARCHED BY:



Pedowitz, David MD, USA



Literature:

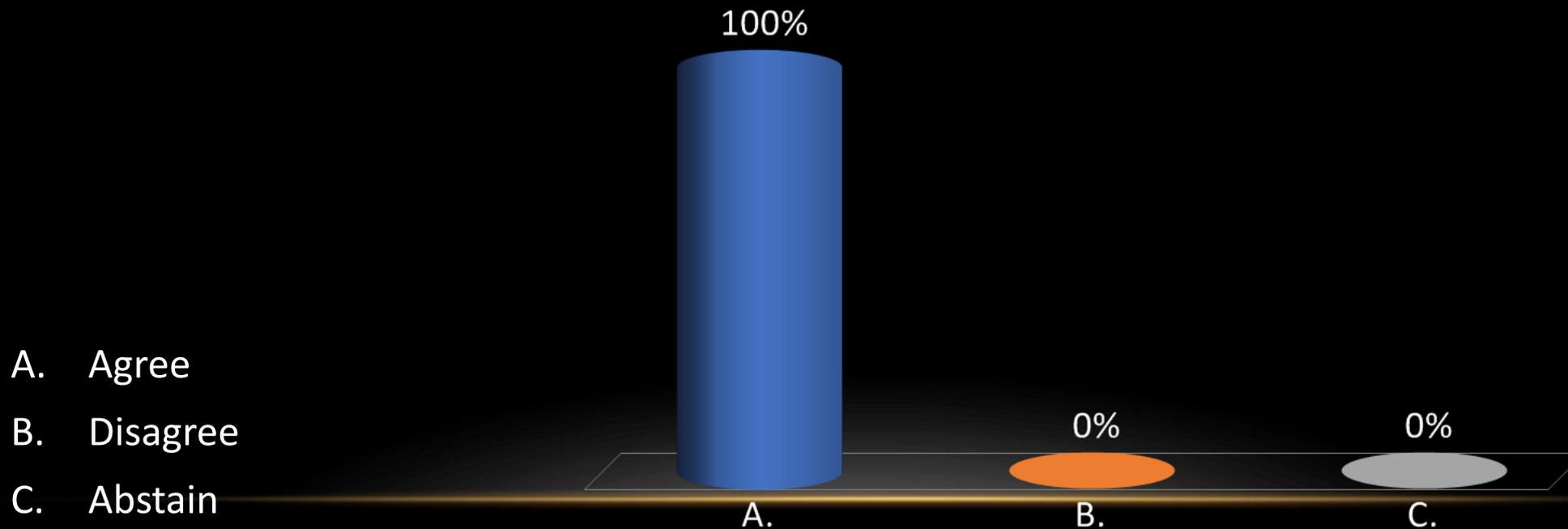
- ***Meta-analysis/Systematic Review 0**
- ***Prospective/Randomized 0**
- ***Retrospective 14**

***Consistent evidence for treating infection following traumatic foot and ankle procedures or fusions is by targeting antibiotic therapy to the specific pathogen**

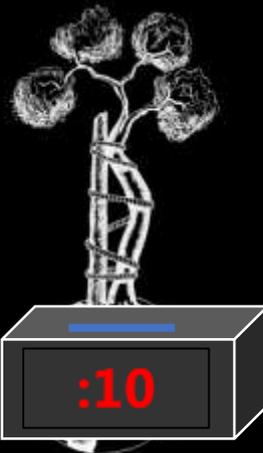


Recommendation: The optimal antibiotic treatment after foot/ankle fractures or fusion should be determined based on the result of culture. In the absence of culture results, administered antibiotics should include coverage against common pathogens such as *Staphylococcus aureus*.

Level of Evidence: Strong



- A. Agree
- B. Disagree
- C. Abstain



F-39 (Former F- 34) What is the treatment "algorithm" for infection after Achilles tendon repair/reconstruction?

RESEARCHED BY:



Winters, Brian MD, USA



Da Rin de Lorenzo, Ferdinando MD, Italy



Literature:

- ***Meta-analysis/Systematic Review 2**
- ***Prospective/Randomized 0**
- ***Retrospective 20**

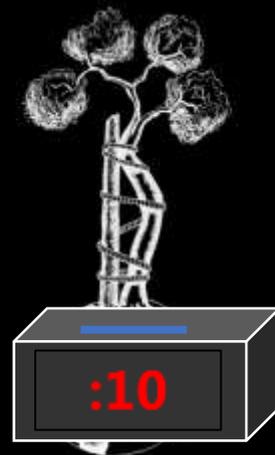
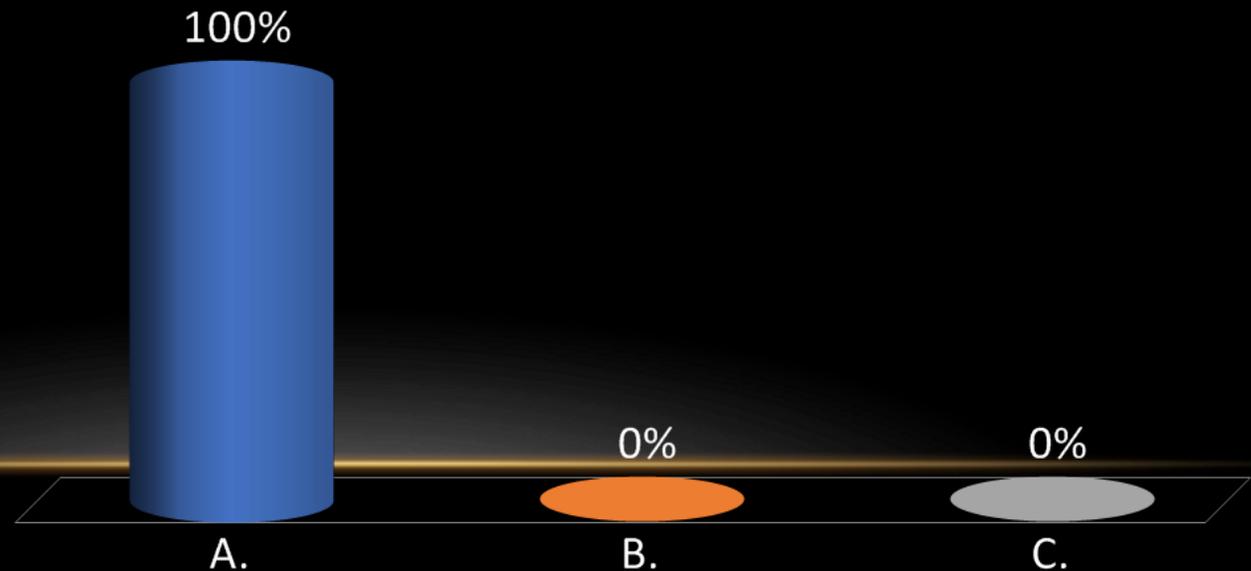
***Inconsistent and low level evidence for a definitive treatment algorithm; limited evidence for debridement of infected tissue, culture sampling, and culture-driven antibiotic administration**



Recommendation: The initial treatment of an infected Achilles tendon reconstruction should include thorough debridement of all infected tissues with removal of retained sutures or foreign material. Cultures should be taken at the time of debridement and antibiotic administration should be dictated by the result of culture and continued until inflammatory markers and clinical symptoms normalize. If significant soft tissue defect in the overlying area remains, the choice of tendon reconstruction and/or transfer with soft tissue coverage should be left up to the discretion of the treating surgeon based on preference and expertise. Revision reconstruction should be delayed until infection is cleared.

Level of Evidence: Moderate

- A. Agree
- B. Disagree
- C. Abstain



F-40 (Former F- 15) Should treatment of diabetic foot osteomyelitis be based on bone biopsies?

RESEARCHED BY:



Heidari, Nima MD, UK



Literature:

- ***Meta-analysis/Systematic Review 4**
- ***Prospective/Randomized 0**
- ***Retrospective 16**

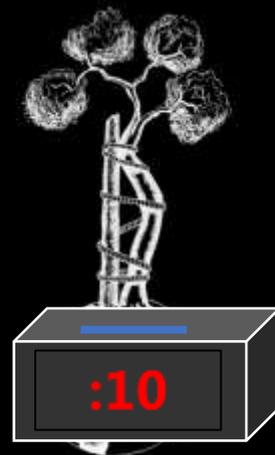
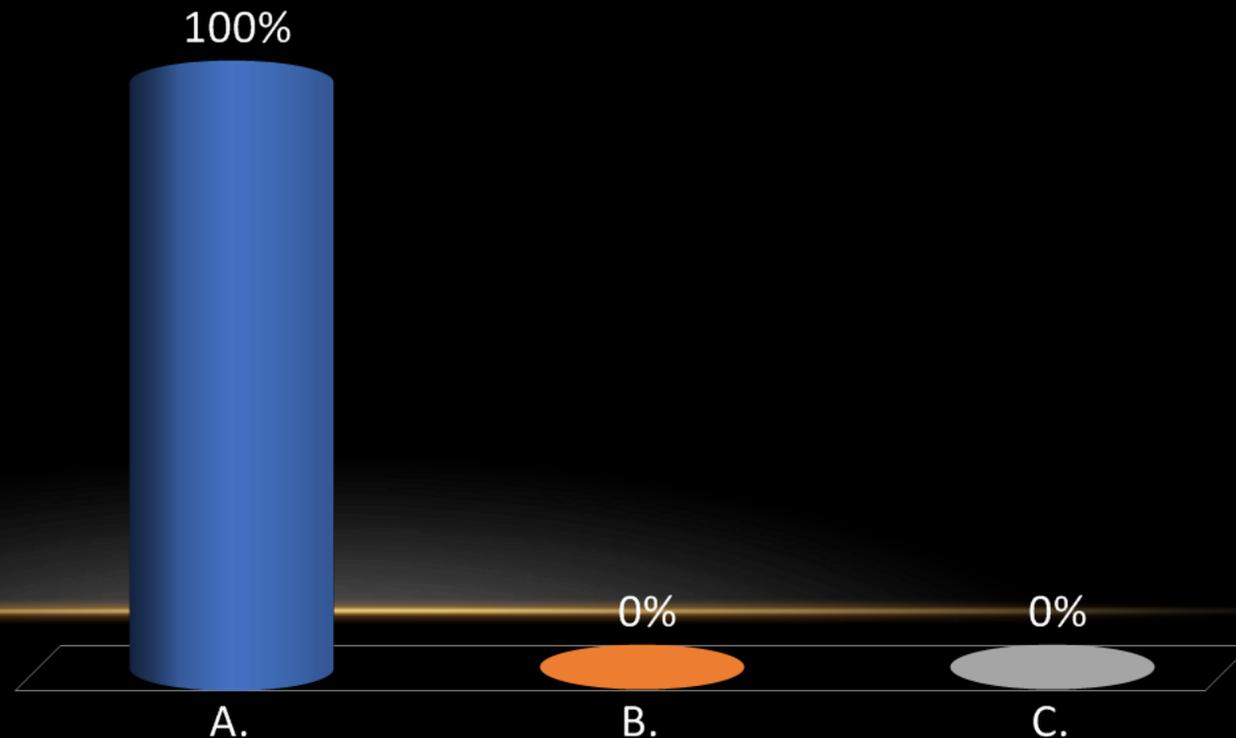
***Moderate evidence for bone biopsy as the diagnostic criterion standard for diabetic foot osteomyelitis and for guiding antibiotic treatment of infection**



Recommendation: Yes. Bone biopsies play both a crucial diagnostic and interventional role in the management of diabetic foot infection. While bone biopsies are not required in every case of diabetic foot infection, their most important role is in guiding accurate antibiotic treatment, as they provide more accurate microbiological information than superficial soft tissue samples in patients with diabetic foot osteomyelitis.

Level of Evidence: Moderate

- A. Agree
- B. Disagree
- C. Abstain



Foot & Ankle ICM Voting Notes

- Question voting commenced at approximately 4pm EST on Thursday, July 26th, with 12 delegates in attendance
- 10/13 delegates who were in attendance for the discussion portion on Wednesday, July 25th were present for voting
 - 1 delegate (FDRdL) never planned to participate in the voting, as he was at the airport for his return flight at the time of voting
- 2 delegates did not attend the discussion portion but were present during voting

