

Elbow

ICM 2018



Elb-2: Does previous surgery (arthroscopic, fracture fixation, other nonarthroplasty) increase the risk of subsequent elbow PJI?

RESEARCHED BY:



Barco Laakso, Raul MD, Spain



Antuña, Samuel MD, Spain



Literature:

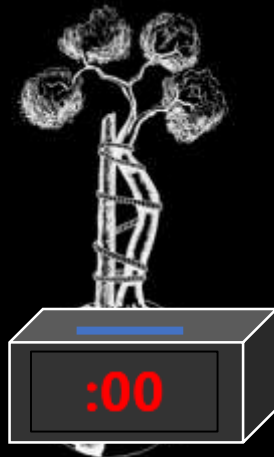
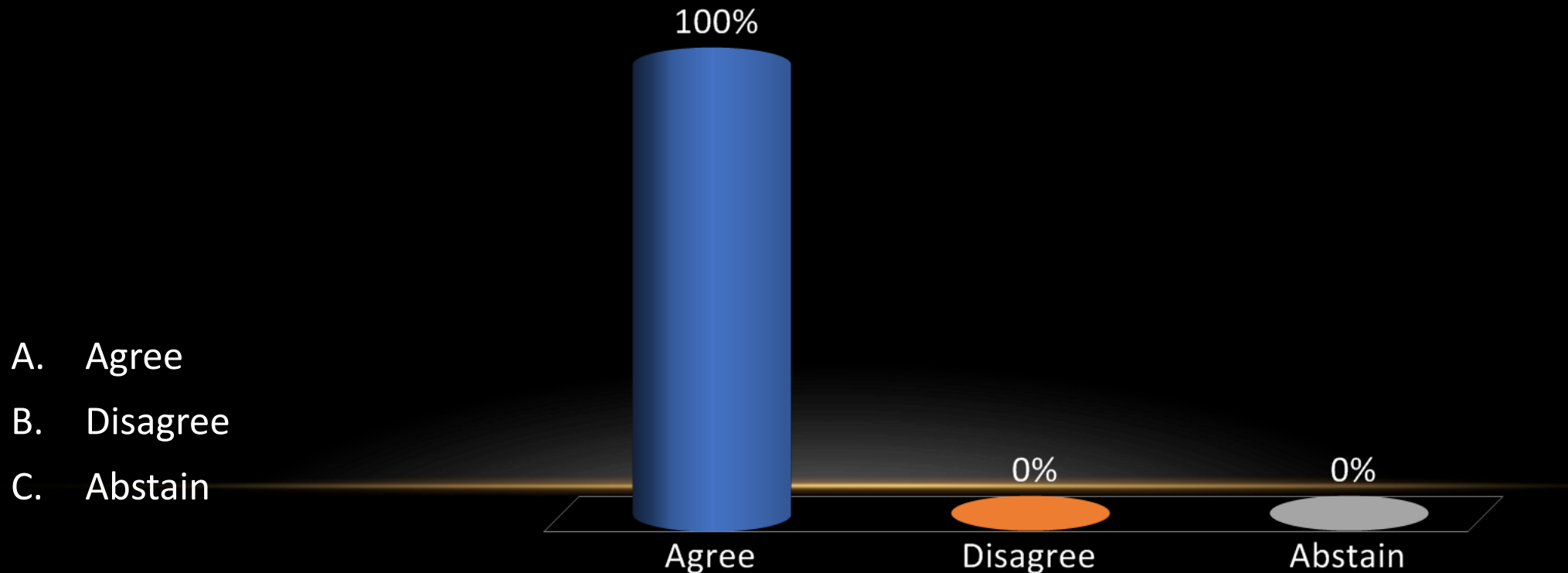
- Systematic review:
 - 227 citations → 57 articles full reviewed
 - 35 studies included (all level IV evidence)
 - 6 studies reported on previous surgery
 - 201 / 291 had prior surgery
 - Infection rate 11% versus 5.5%



Recommendation:

There is an apparent increase in the percentage of infections among patients with a previous operation in the affected elbow joint, the association is not robust and needs to be further analyzed.

Level of Evidence: Limited



Elb-3: What are the optimal prophylactic perioperative antibiotics for patients undergoing total elbow arthroplasty?

RESEARCHED BY:



Barco Laakso, Raul MD, Spain



Antuña, Samuel MD, Spain



Literature:

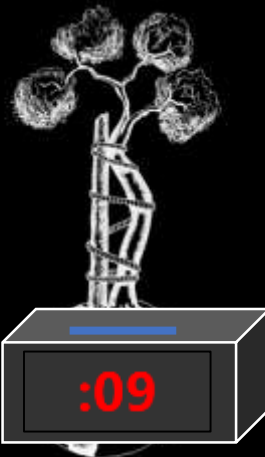
- Systematic review:
 - 227 citations → 56 articles full review
 - 35 studies underwent data collection
 - Six studies total (1 national registry)
 - 303 infections / 6,681 total patients (5.6%)
 - 5 reported pathogen
- Recommendation based upon pathogens identified and reported use throughout the community.



Recommendation: Patients undergoing primary elbow arthroplasty should receive antibiotics that cover gram-positive and gram-negative organisms specific to the regionally encountered organisms. Peer-reviewed literature supports cefazolin be dosed based on body weight. Patients with **MRSA colonization** should receive weight-based glycopeptide, preferably in combination with cefazolin. Patients with a true hypersensitivity reaction or adverse reaction that precludes the use of cefazolin should receive vancomycin or clindamycin.

Level of Evidence: Consensus

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



Elb-4/5: What is the evidence and recommendation for the use of antibiotic laden bone cement (ALBC): a) In primary total elbow arthroplasty (TEA)? b) In revision TEA?

RESEARCHED BY:



Mansat, Pierre MD, France

Morrey, Bernard MD, USA



Literature:

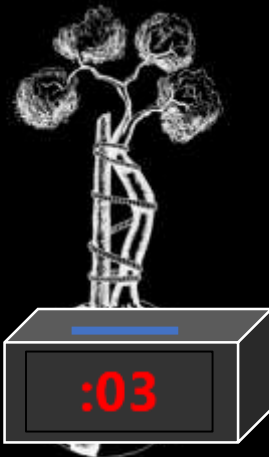
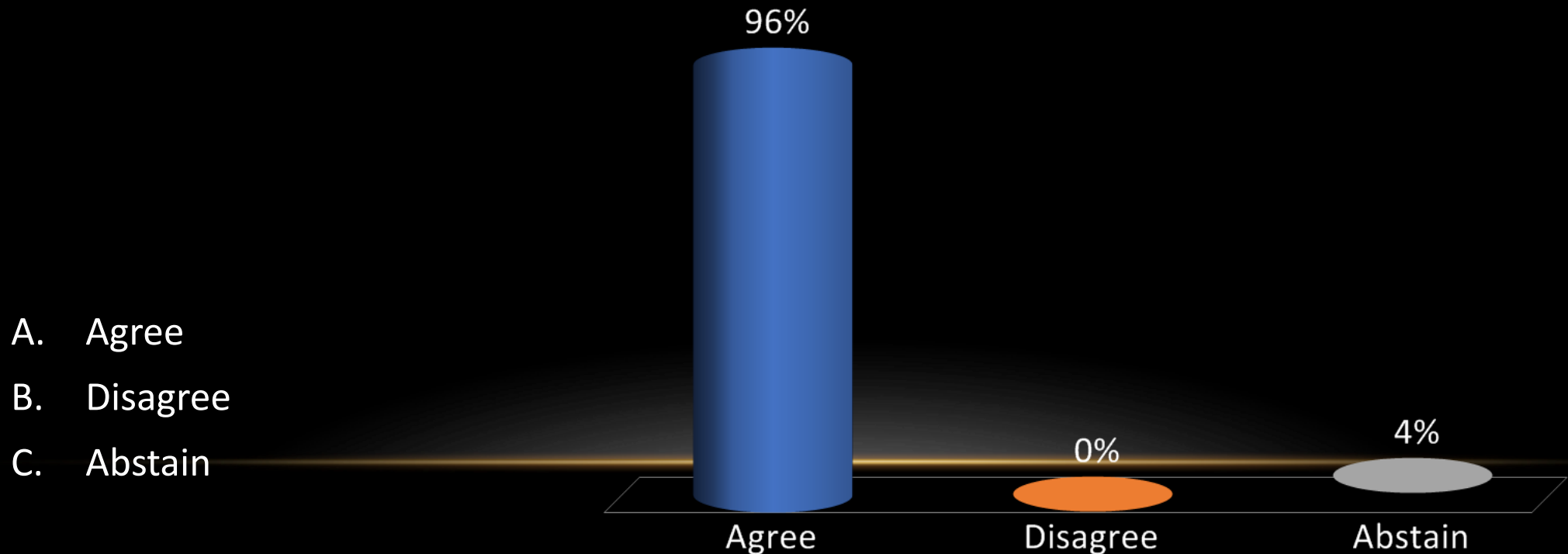
- Systematic Review:
 - No elbow specific studies available
- Recommendation limited due to lack of evidence
- Document supports use of ALBC based upon extrapolated data and increased risk of PJI in the elbow.



Recommendation:

There is inadequate evidence to support the use of antibiotic laden bone cement during primary or revision total elbow arthroplasty.

Level of Evidence: No Evidence



Elb-6: What is the role for serum ESR, CRP, or WBC count in the evaluation of an elbow arthroplasty for PJI?

RESEARCHED BY:



Mighell, Mark MD, USA

Frankle, Mark MD, USA



Literature:

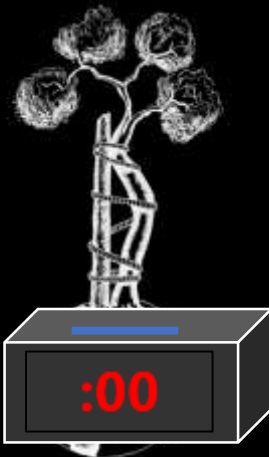
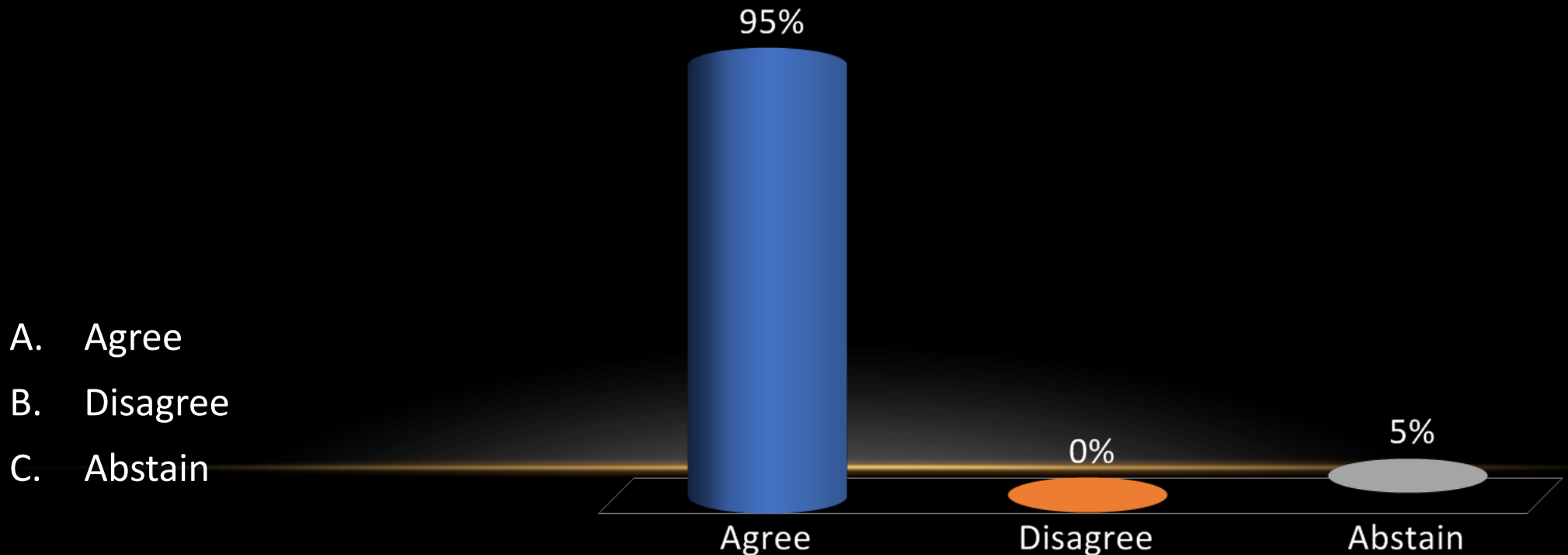
- Literature review:
 - Limited direct analysis of serology and diagnosis of elbow PJI
 - Recommendation based upon expert opinion, consensus, and extrapolation of data from other joints.



Recommendation:

ESR, CRP, and WBC play a role in screening and monitoring for infection in the setting of PJI, though evidence is limited regarding specific thresholds and strategies to guide the surgeon when interpreting these values.

Level of Evidence: Consensus



Elb-7: Is there a role for preoperative joint aspiration in the evaluation of the elbow arthroplasty for PJI?

RESEARCHED BY:



Voloshin, Ilya MD, USA



Blaine, Theodore MD, USA



Literature:

- Literature review:
 - Elbow: 1 expert opinion, 2 retrospective reviews (not directly evaluating joint aspiration)
 - Recommendation combination of expert opinion and extrapolation of data from other joints

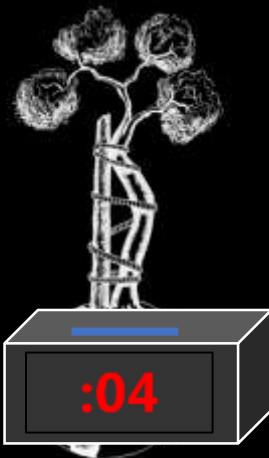
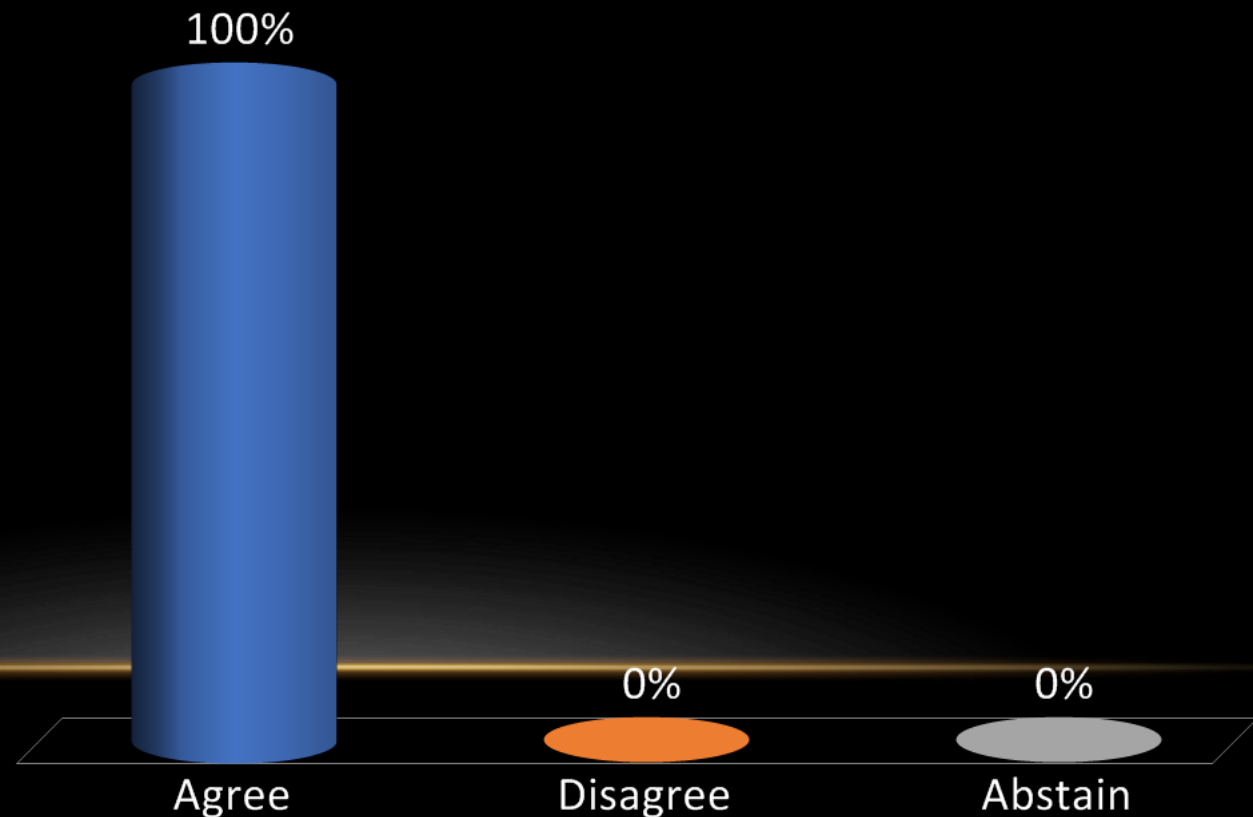


Recommendation:

Preoperative joint aspiration can play a role in the evaluation of the painful total elbow arthroplasty suspected for infection.

Level of Evidence: Limited

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



Elb-8: Is there a role for preoperative joint aspiration prior to second stage revision after treatment of elbow PJI?

RESEARCHED BY:



Blaine, Theodore MD, USA



Voloshin, Ilya MD, USA



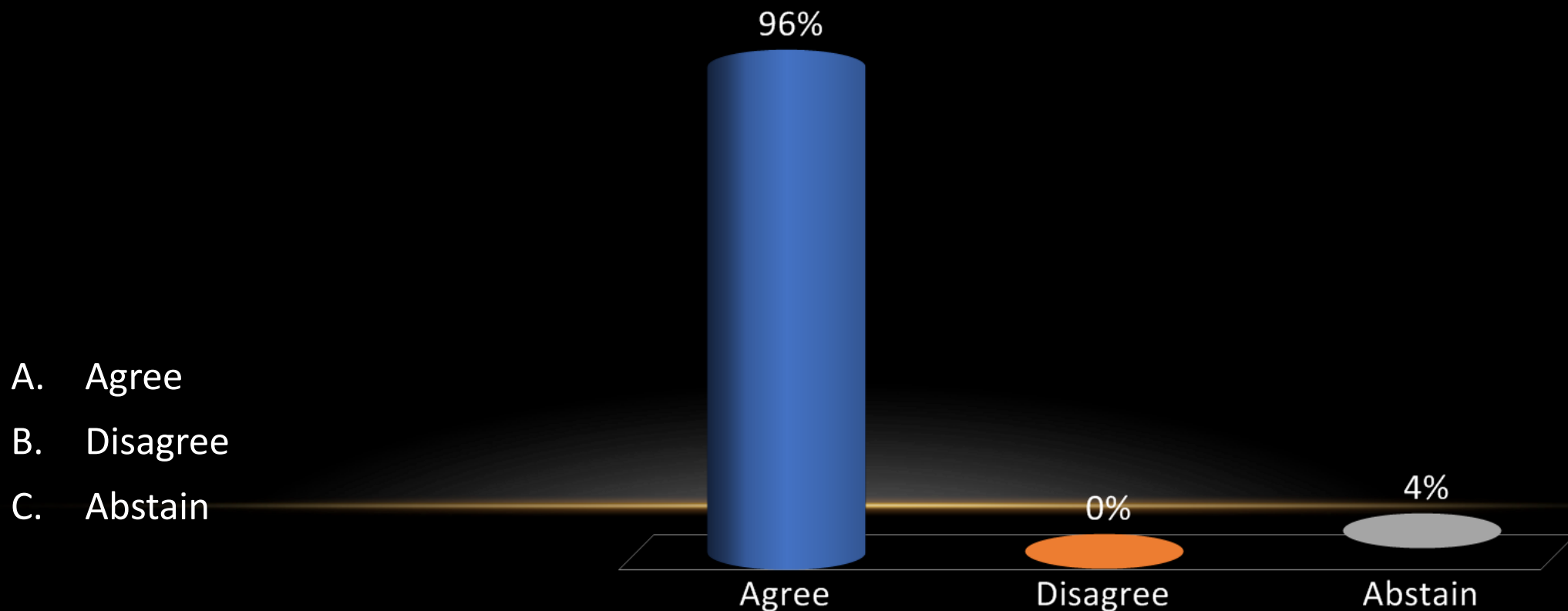
Literature:

- Literature review:
 - “There are no studies that specifically investigate and prove that there is a role for pre-operative aspiration of the elbow prior to second stage revision arthroplasty.”
 - Recommendation based upon existing expert opinion and extrapolation from other joints.

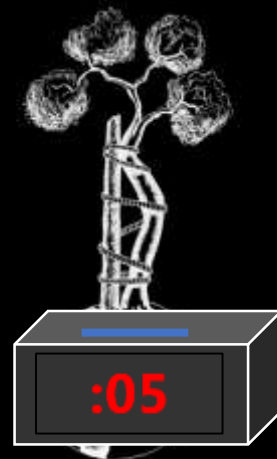


Recommendation: Preoperative joint aspiration may play a role in the evaluation of the elbow arthroplasty for PJI before second stage revision.

Level of Evidence: Consensus



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



Elb-9: What is the role of intraoperative histology examination in the evaluation of an elbow arthroplasty for PJI?

RESEARCHED BY:



Marra, Guido MD, USA



Ramsey, Matthew MD, USA



Literature:

- Literature search:
 - “Our extensive search of the literature revealed only one study that specifically examines the subject of histology in diagnosis of infected total elbow arthroplasty (Ahmadi 2013).”
 - 208 patients undergoing revision elbow arthroplasty
 - The sensitivity of histology in diagnosis of PJI was 51.3%, and a specificity of 93.1%.

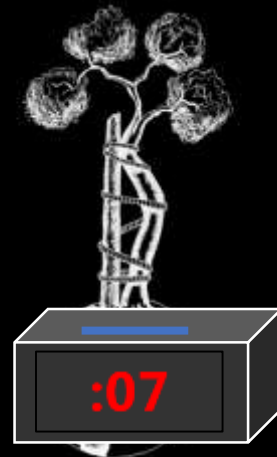
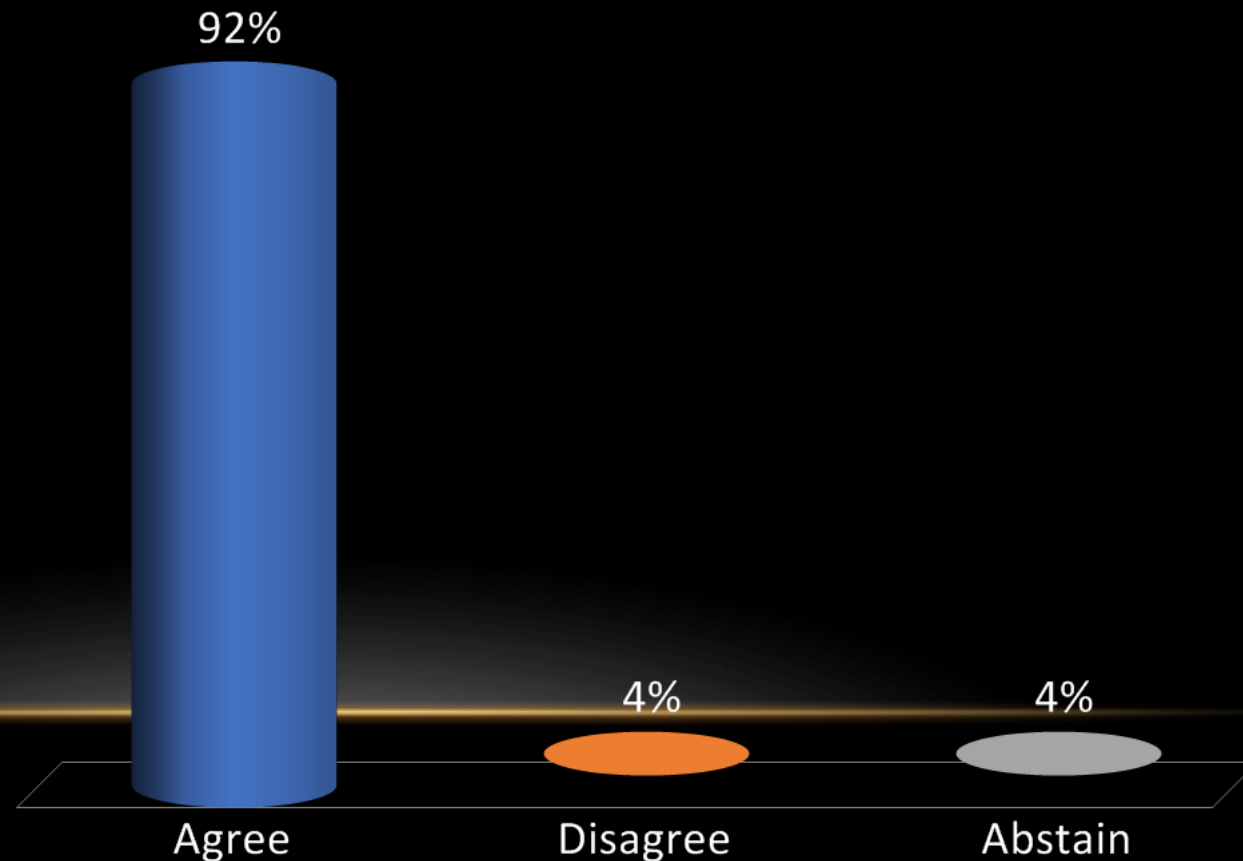


Recommendation:

Intraoperative histology for the evaluation of elbow PJI in isolation is not sufficient for the diagnosis of infection.

Level of Evidence: Limited

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



Elb-10: Is there a role for sonication of retrieved implants from an elbow in diagnosis of a possible prosthetic joint infection?

RESEARCHED BY:



McKee, Michael MD, Canada



King, Graham MD, Canada



Literature:

- Literature search provided single elbow-specific analysis:
 - 36 revision cases
 - sonification of implant had a sensitivity of 89% and a specificity of 100%,
 - Not statistically different than standard cultures
- Vergidis P, Greenwood-Quaintance KE, Sanchez-Sotelo J, Morrey BF, Steinmann SP, et al. Implant sonication for the diagnosis prosthetic elbow infection. J Shoulder Elbow Surgery. 2011 December, 20(8):1275-1281.

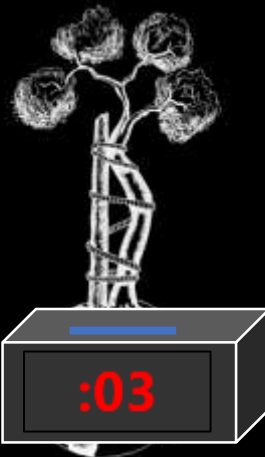
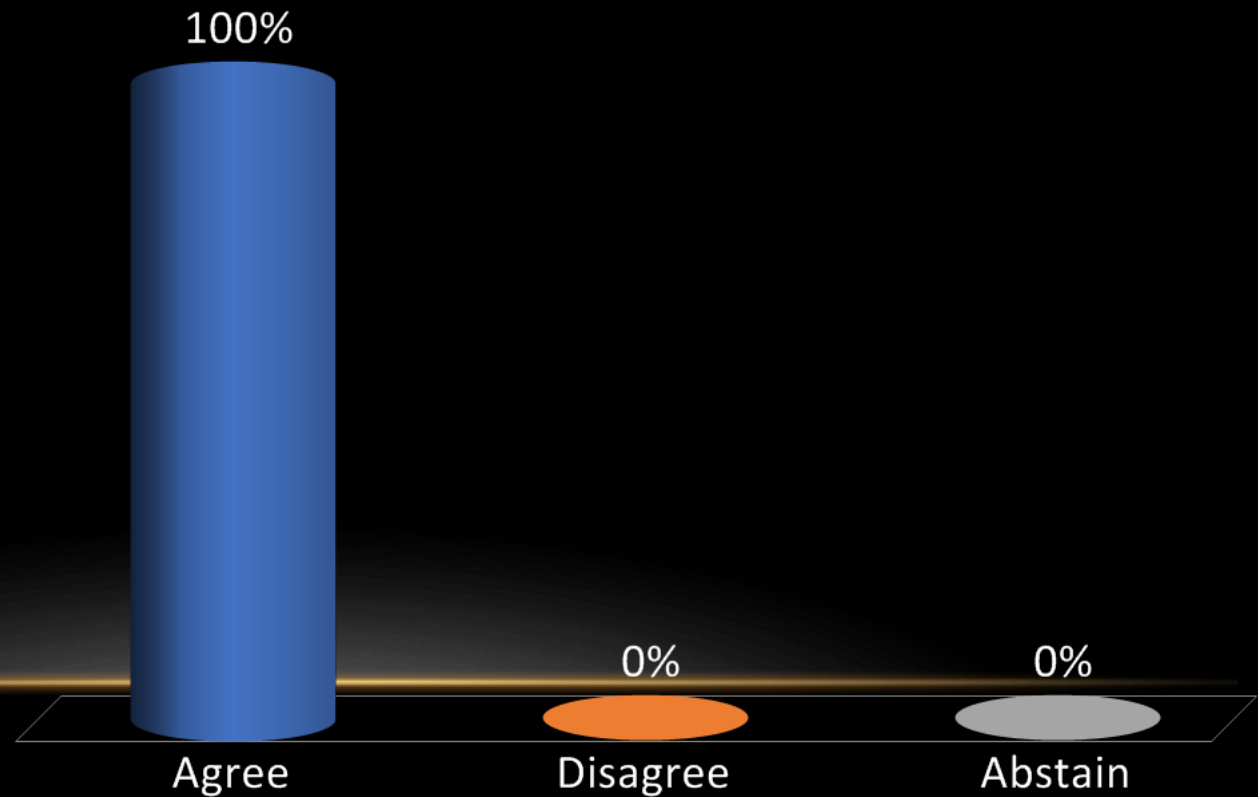


Recommendation:

At present, there is no evidence to support the routine use of sonication of removed elbow implants to improve the diagnostic accuracy or yield of cultures in the diagnosis of elbow PJI.

Level of Evidence: Limited

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



Elb-11: Do molecular markers have a role in the diagnosis of elbow prosthetic joint infection (PJI)?

RESEARCHED BY:



Morrey, Mark MD, USA



O'Driscoll, Shawn MD, USA



Literature:

- Systematic review:
 - 180 articles reviewed
 - 3 studies (containing 3 elbows total)
- Recommendation extrapolated from other joints / deferred for elbow-specific study.

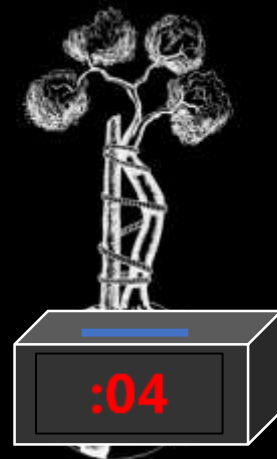
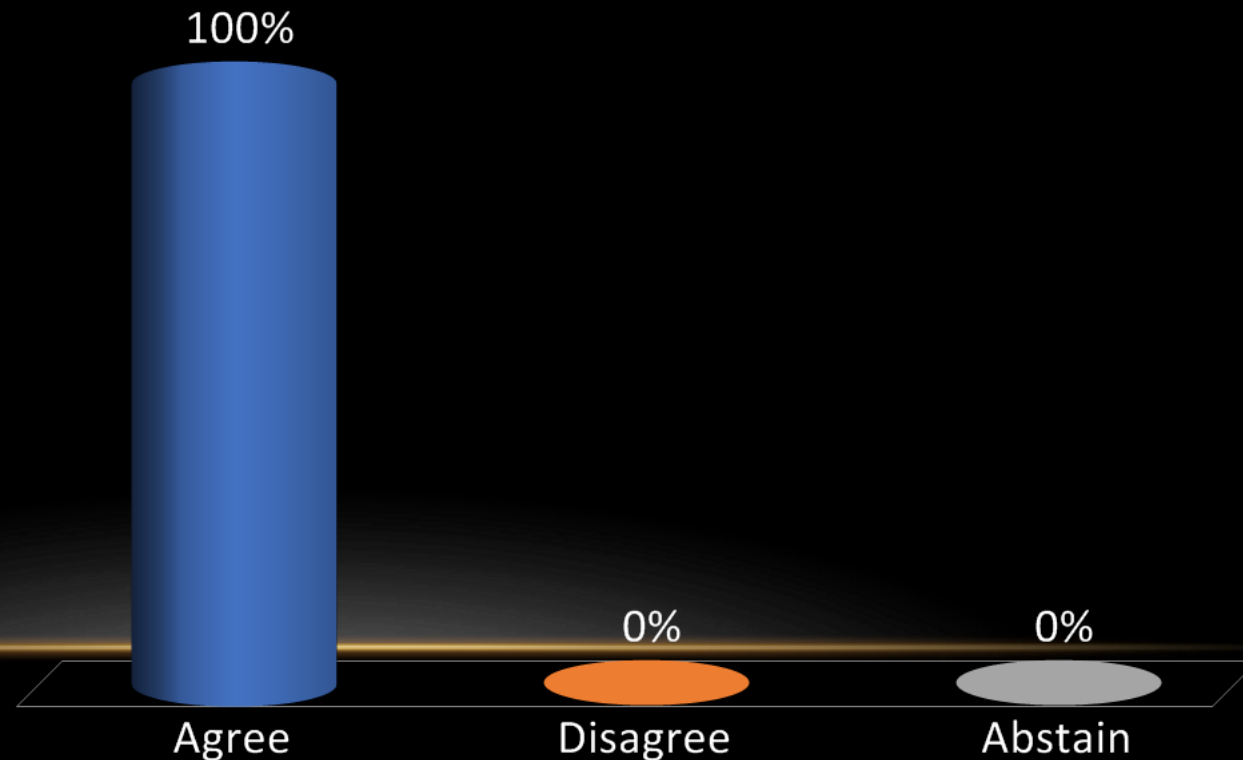


Recommendation:

Despite the presence of data related to the use of molecular markers for diagnosis of infection in hip and knee arthroplasty, the role of molecular markers in diagnosis of total elbow arthroplasty infection remains unknown.

Level of Evidence: Limited

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

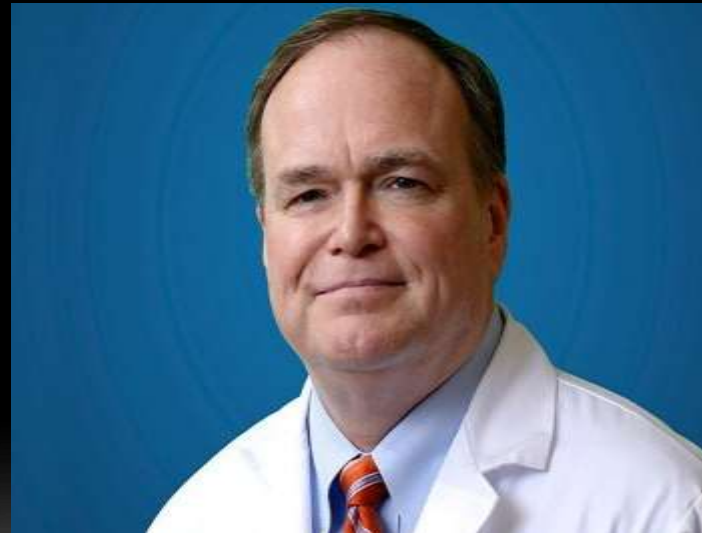


Elb-12: Is there a role for irrigation and debridement with implant retention (DAIR) when treating acute elbow PJI? Should modular implant parts be exchanged?

RESEARCHED BY:



Cohen, Mark MD, USA



Hotchkiss, Robert N MD, USA



Literature:

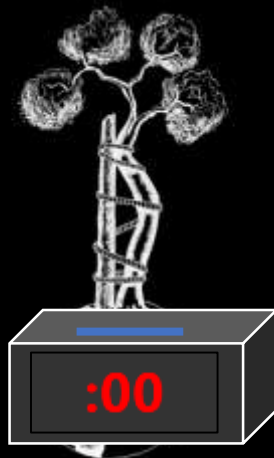
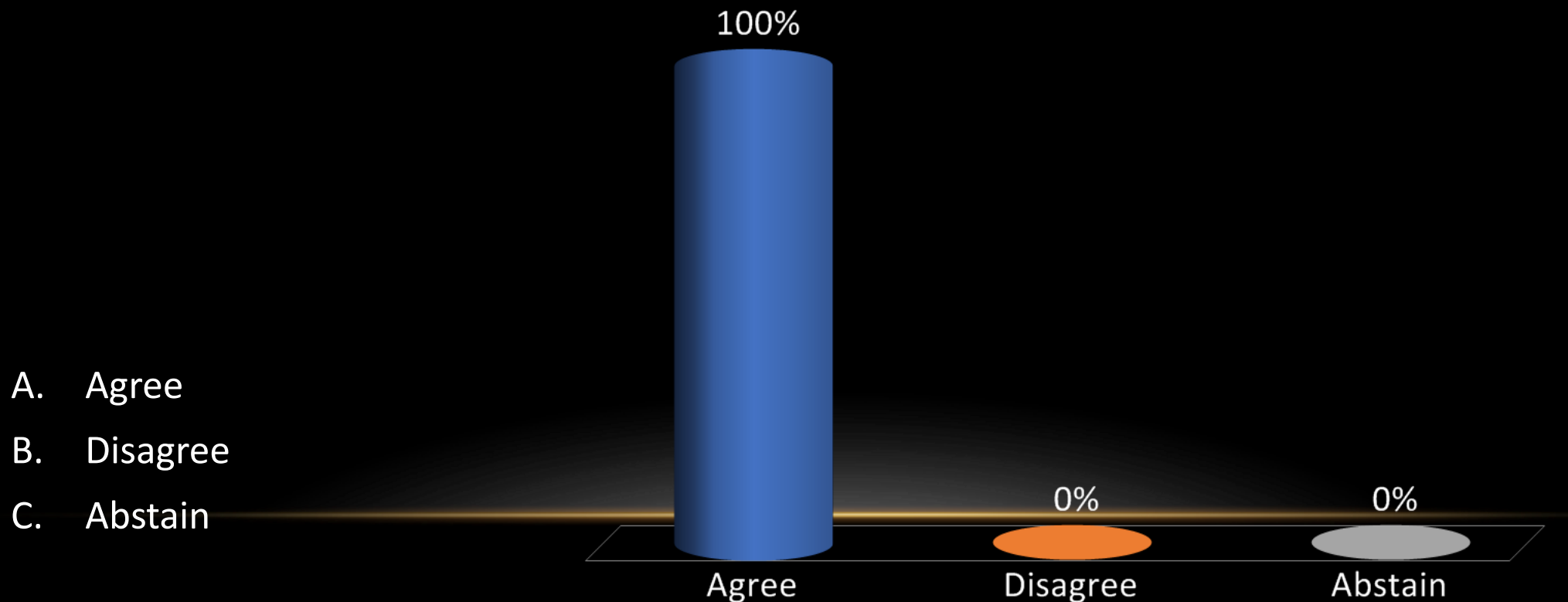
- Literature review:
 - No direct comparison of treatment options available
 - Elbow suffers from significant morbidity with removal of well-fixed components
- Recommendation based upon expert opinion and 4 retrospective analyses



Recommendation:

Surgical debridement, irrigation and retention of implant (DAIR) is a viable option for management of acute elbow PJI. Modular implant exchange should be considered.

Level of Evidence: Limited



Elb-13: What are the indications for one-stage and two-stage exchange arthroplasty when treating an acute or chronic elbow PJI?

RESEARCHED BY:



Throckmorton, Thomas MD, USA



Duquin, Thomas MD, USA



Literature:

- Literature review:
 - Level IV data only
 - 9 retrospective analyses and 1 expert opinion

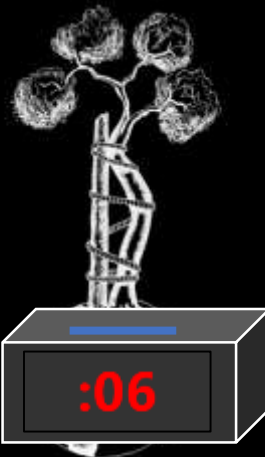
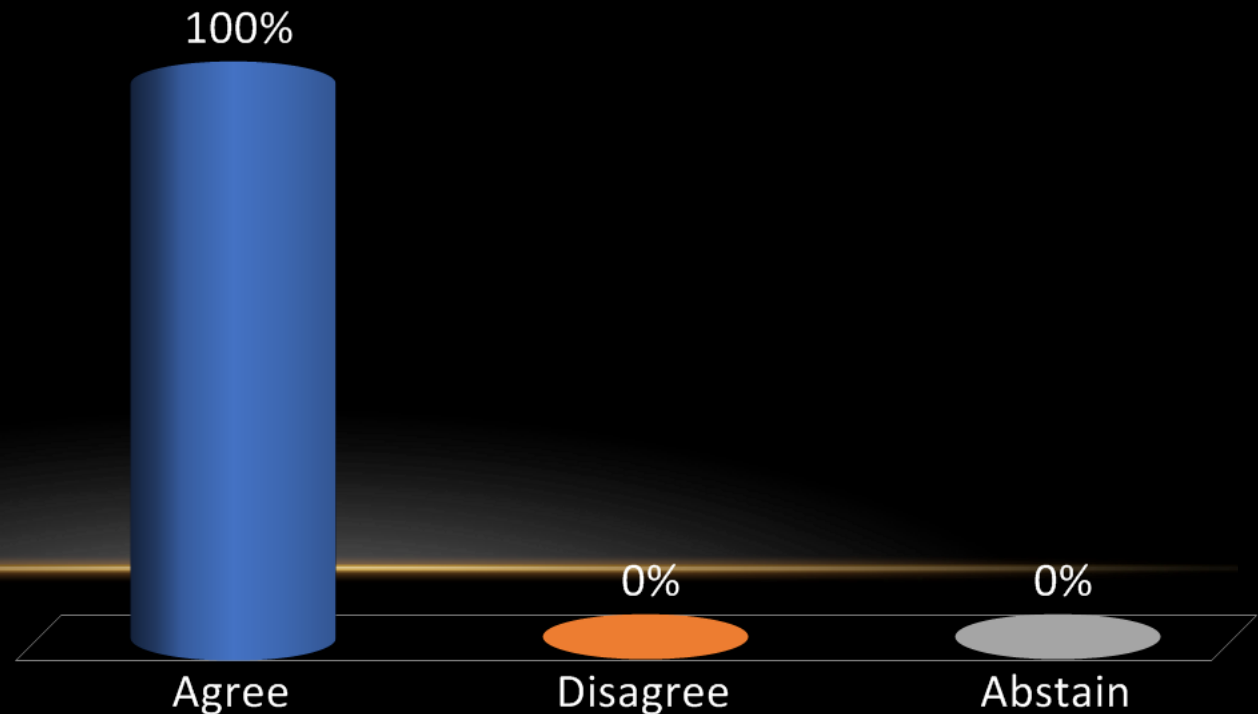


Recommendation:

Two-stage exchange arthroplasty should be considered for patients with chronic elbow PJI. There are no clear indications for one-stage exchange arthroplasty for infected TEA but two-stage exchange is preferred in patients with sinus tract and/or compromised soft tissues around the elbow or those with systemic sepsis.

Level of Evidence: Consensus

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



Elb-14: What is the role of permanent resection when treating a chronic elbow PJI?

RESEARCHED BY:



Cil, Akin MD, USA



Sabesan, Vani MD, USA



Literature:

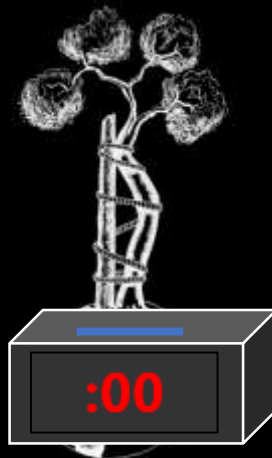
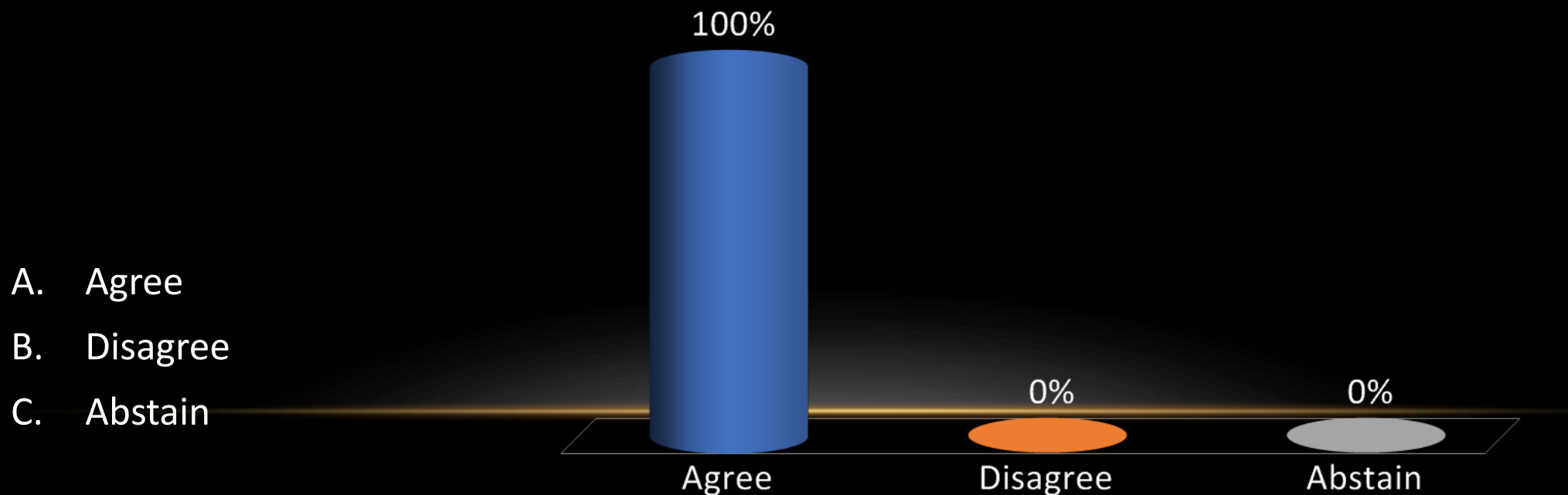
- Systematic review:
 - Level IV and V data
 - 3 expert opinion
 - 9 retrospective analyses
 - 1 systematic review



Recommendation:

Permanent resection is a salvage treatment for chronic elbow PJI. Preservation of medial and lateral condyles should be considered to improve functional outcomes.

Level of Evidence: Limited



Elb-15: What is the role of arthrodesis when treating a chronic elbow PJI?

RESEARCHED BY:



Cil, Akin MD, USA



Sabesan, Vani MD, USA



Literature:

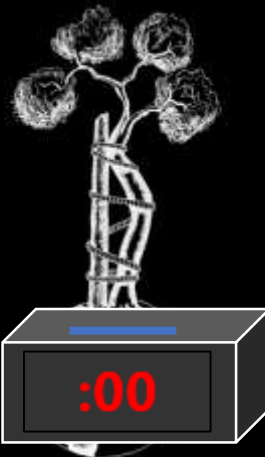
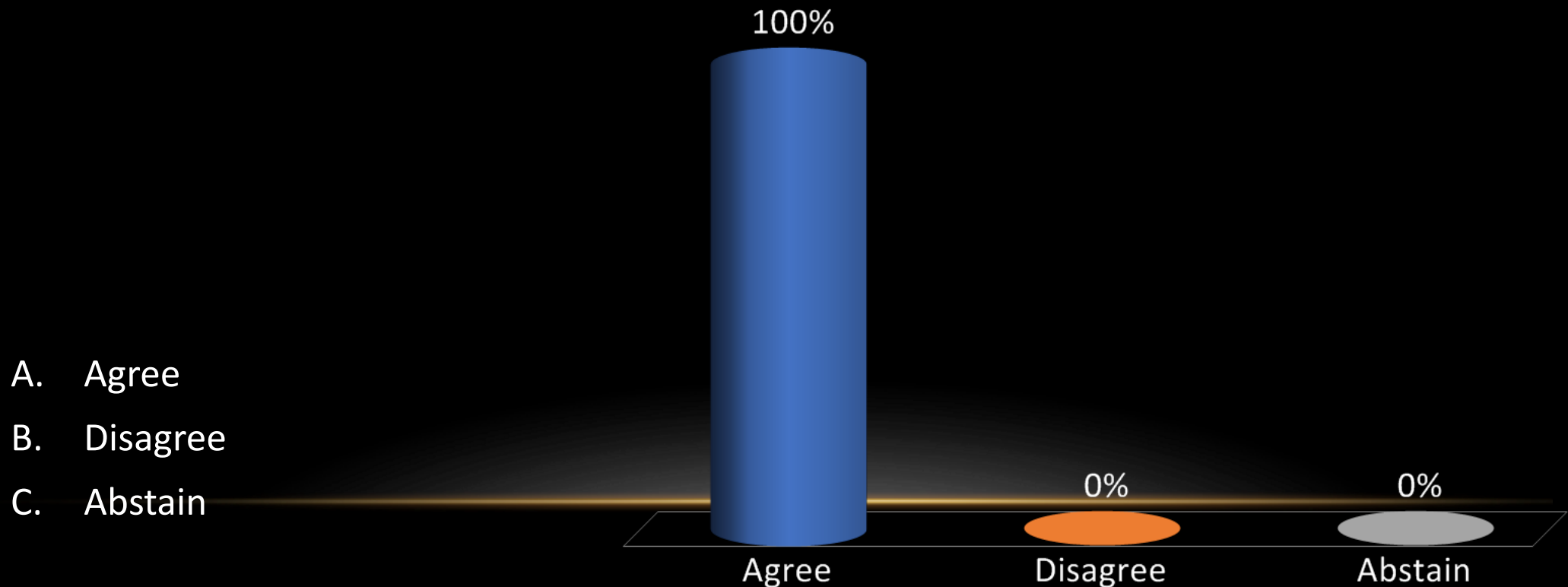
- Literature review:
 - 12 retrospective (2 directly assessing arthrodesis [level IV])
 - 5 expert opinion



Recommendation:

There is very limited role for arthrodesis of an infected elbow as this procedure usually results in painful nonunion and poor functional outcomes.

Level of Evidence: Limited



Elb-16: Should all foreign material (including cement) be removed during resection arthroplasty of an infected elbow?

RESEARCHED BY:



Schoch, Bradley MD, USA



Savoie, Felix H MD, USA



Literature:

- Systematic review:
 - Single case series directly addressing question
 - 3 retrospective analyses of lower extremity arthroplasty

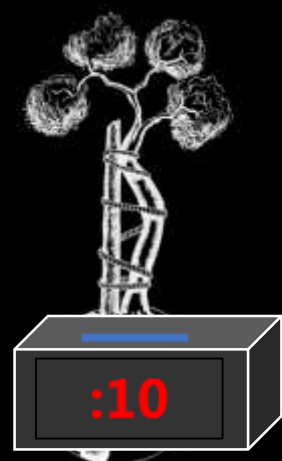
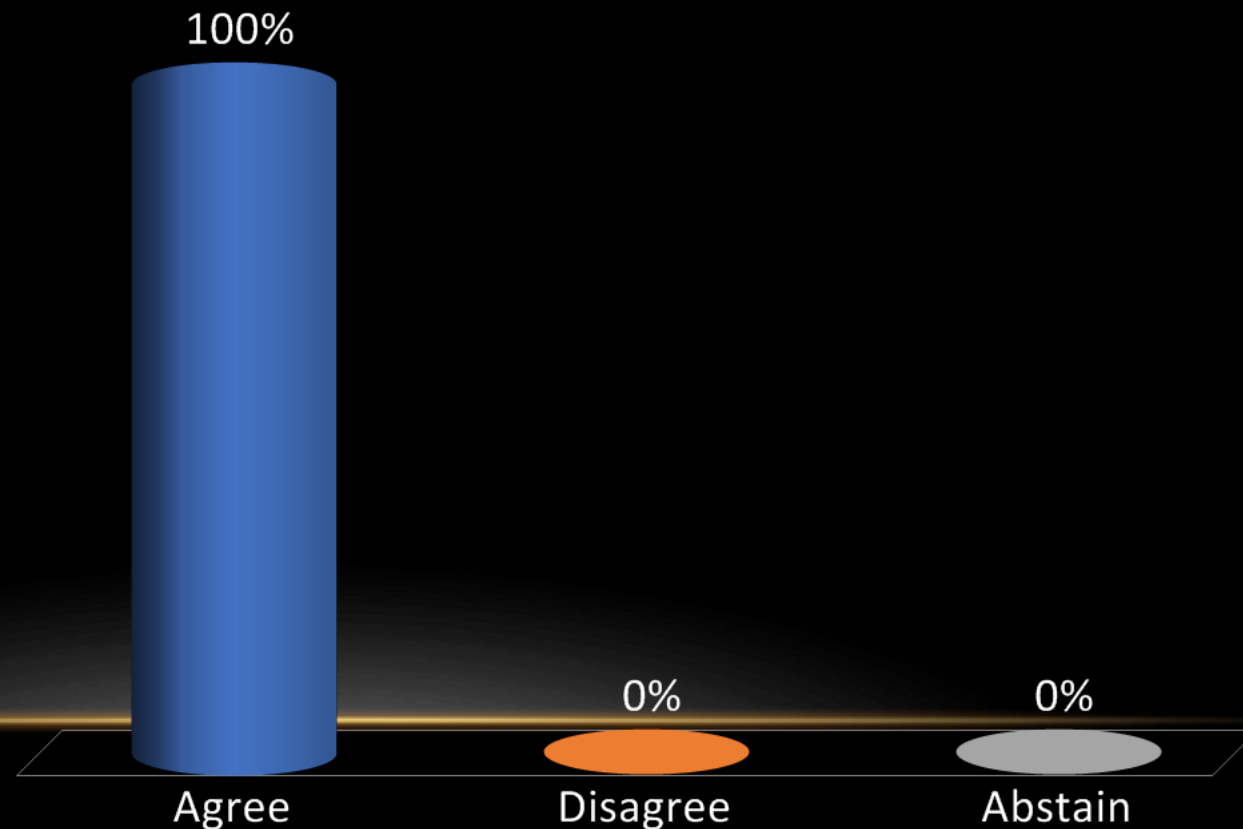


Recommendation:

When treating elbow PJI, attempts should be made to remove all foreign material; however, the benefit of removing all foreign material should be weighed against the effort to preserve bone stock.

Level of Evidence: Limited

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



Elb-17: Is there a role for chronic antibiotic suppression in the management of elbow PJI?

RESEARCHED BY:



Schoch, Bradley MD, USA



Savoie, Felix H MD, USA



Literature:

- Systematic review:
 - Only one analysis including 2 elbow PJI were available on the topic.
 - Recommendations taken from expert opinion and extrapolated from other joints.

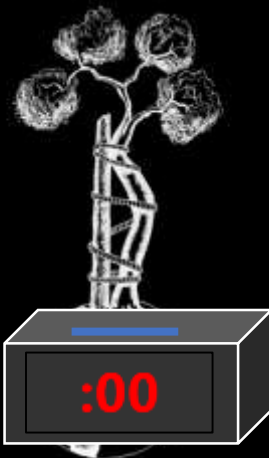
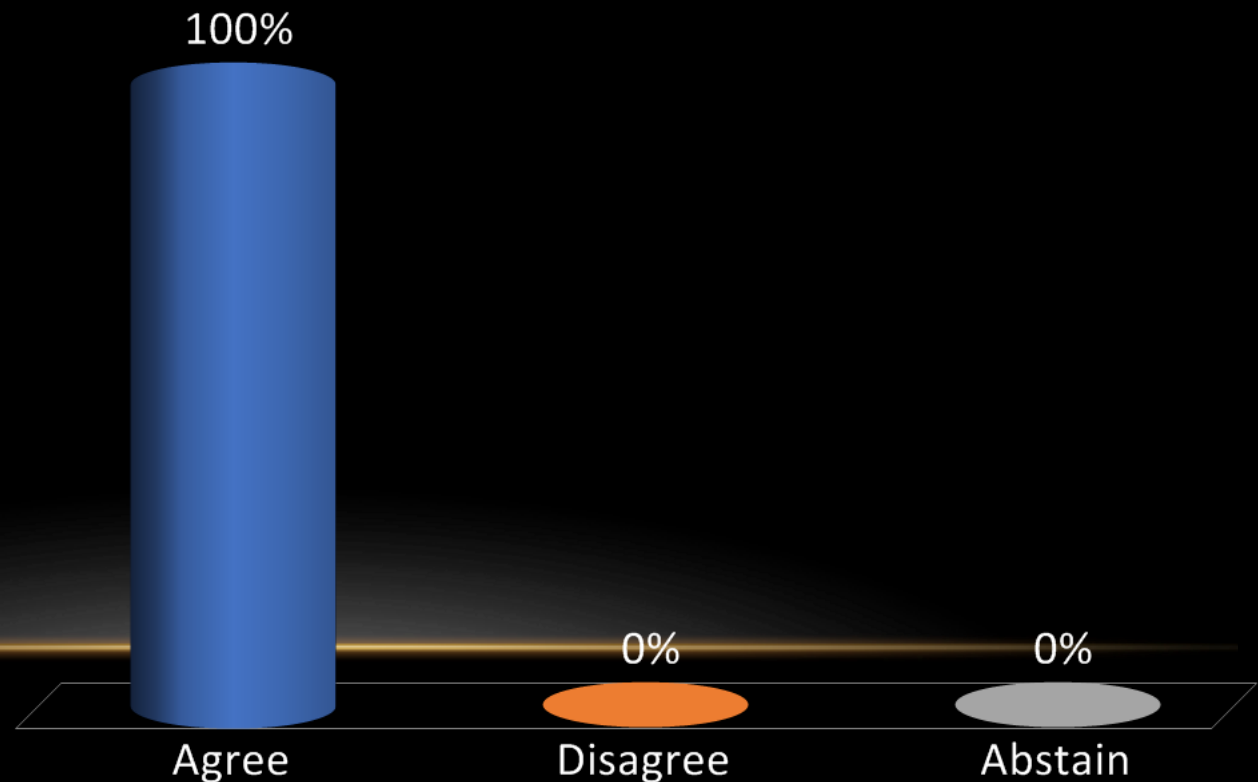


Recommendation:

Long-term suppressive antibiotics may be used in the treatment of PJI of the elbow. Consultation with an infectious disease specialist should be considered in the decision to use long term suppressive antibiotics.

Level of Evidence: Consensus

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



Elb-1: What are the diagnostic criteria for elbow PJI?
(Clinical criteria, radiographic criteria, intraoperative findings, pathology, cultures and serum biomarkers)

RESEARCHED BY:



Barlow, Jonathan MD, USA

Sanchez-Sotelo, Joaquin MD, USA



Literature:

- Literature review:
 - “Culture growth was the most commonly cited diagnostic criteria in the literature.”
 - Varied in literature if 1 versus 2 cultures defines PJI
 - Clinical characteristics often cited in defining PJI
 - **Two studies** addressed early loosening
 - Limited impact of serology secondary to high proportion of inflammatory arthritis



RECOMMENDATION:

The following three provide a definitive diagnosis of elbow PJI:

- A periprosthetic draining sinus tract is diagnostic of TEA PJI (Strength: Strong)
 - Isolation of identical pathogens from two or more separate cultures (tissue or articular fluid) obtained in sterile conditions is diagnostic of TEA PJI (Strength: Strong)
 - Presence of intra-articular pus (Strength: Consensus)
- The following criteria are concerning for infection and should be considered in aggregate (Strength: Limited):
 - Warmth, redness, swelling of the elbow
 - Elevated serum inflammatory markers (ESR, CRP) – except in cases of inflammatory arthropathies
 - Elevated synovial WBC
 - Elevated synovial PMN%
 - Isolation of organism from one sample (tissue or articular fluid)
 - Histologic evidence of elbow PJI
 - Early unexpected component loosening
 - Endosteal scalloping, rapid progressive loosening on radiographs

A. Agree

B. **Disagree** • **Level of Evidence: Consensus**

C. Abstain

