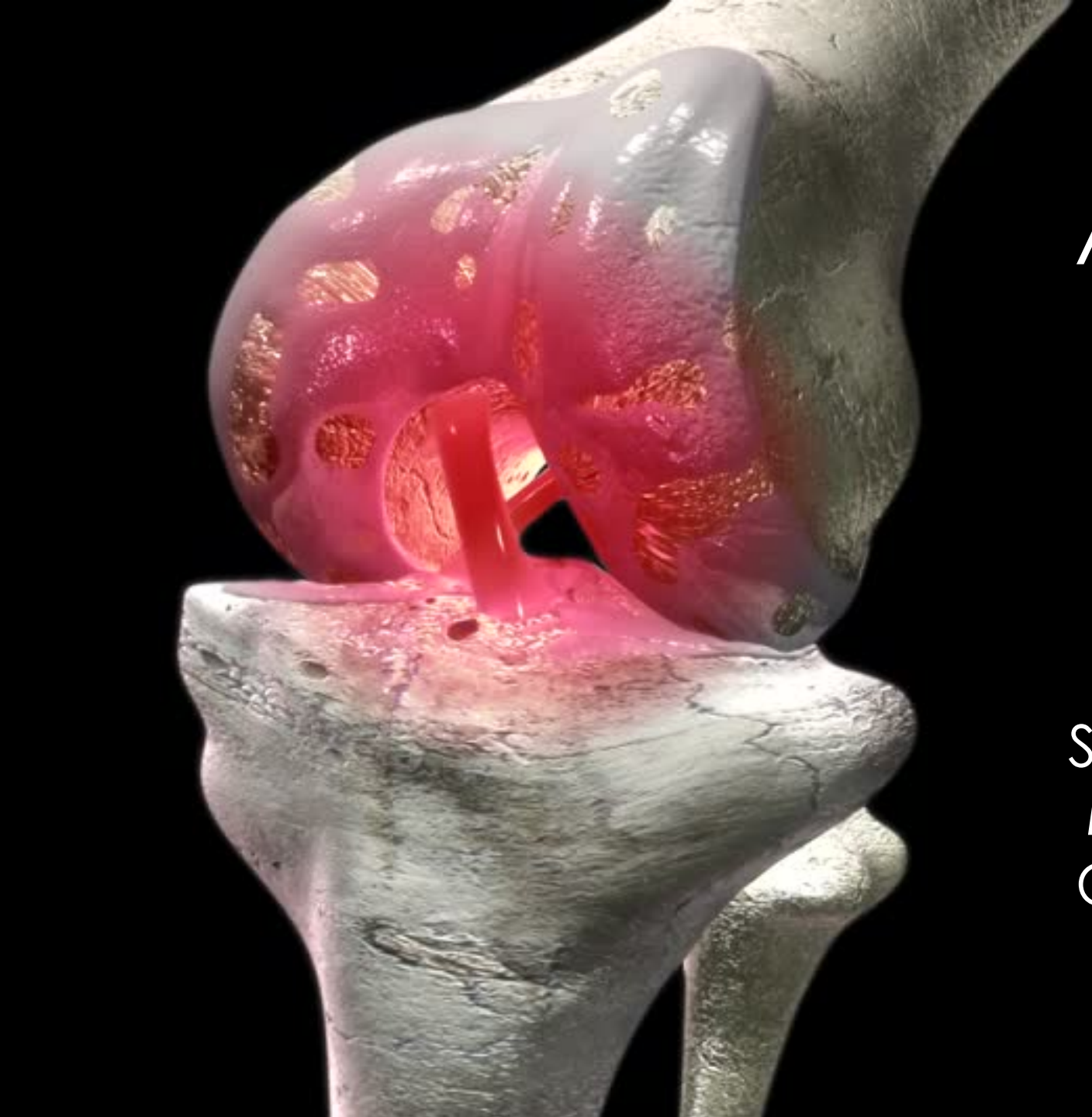
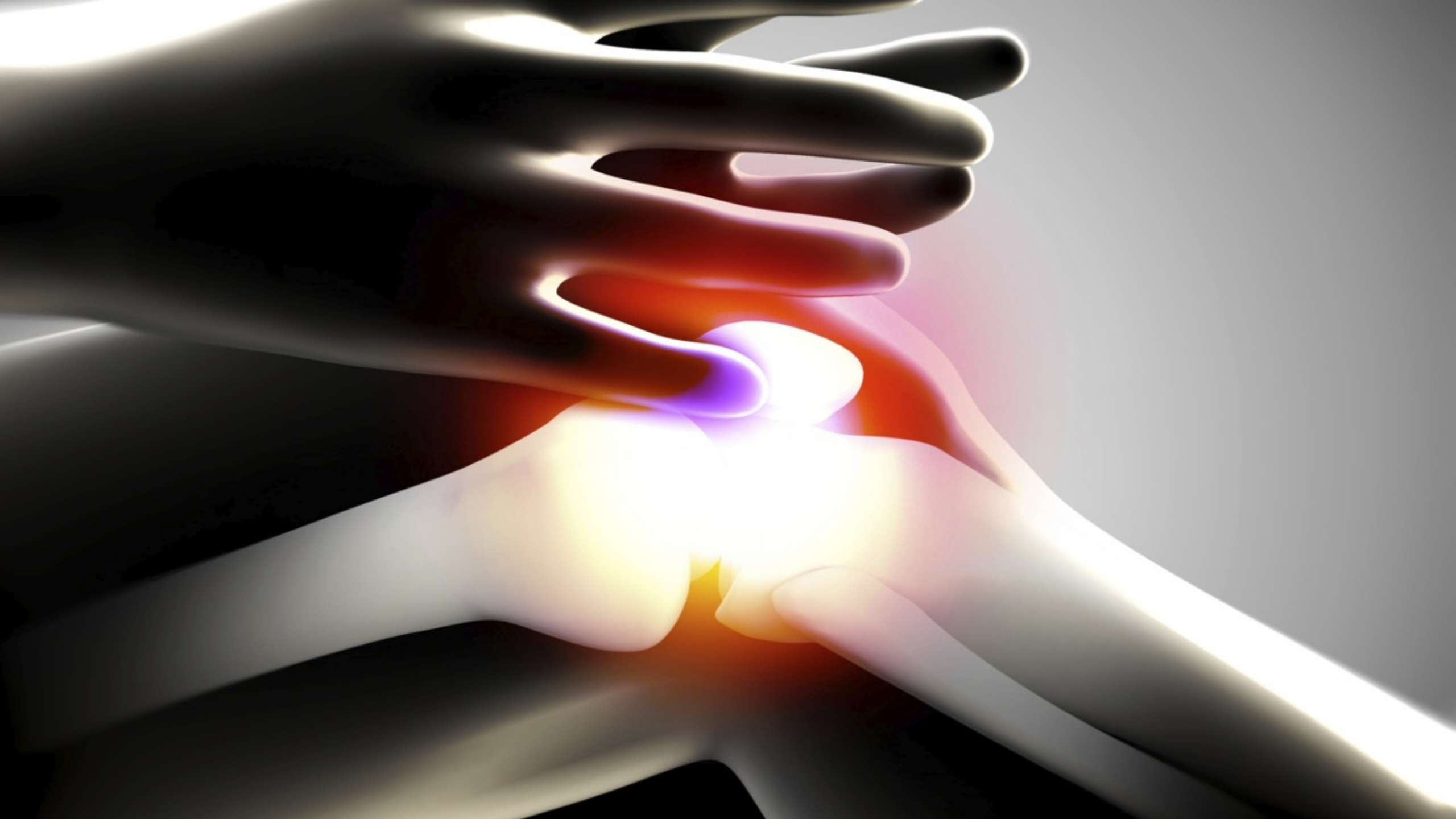


# Artritis séptica y Osteomielitis

Stephan Skog Marambio
Médico internista UdeC
Centro asistencial Víctor Ríos Ruiz



Incidencia 4-29 x 100,000.

Monoarticular.

Rodilla >50%.

Raro en articulaciones axiales.

Mortalidad 10-20%.

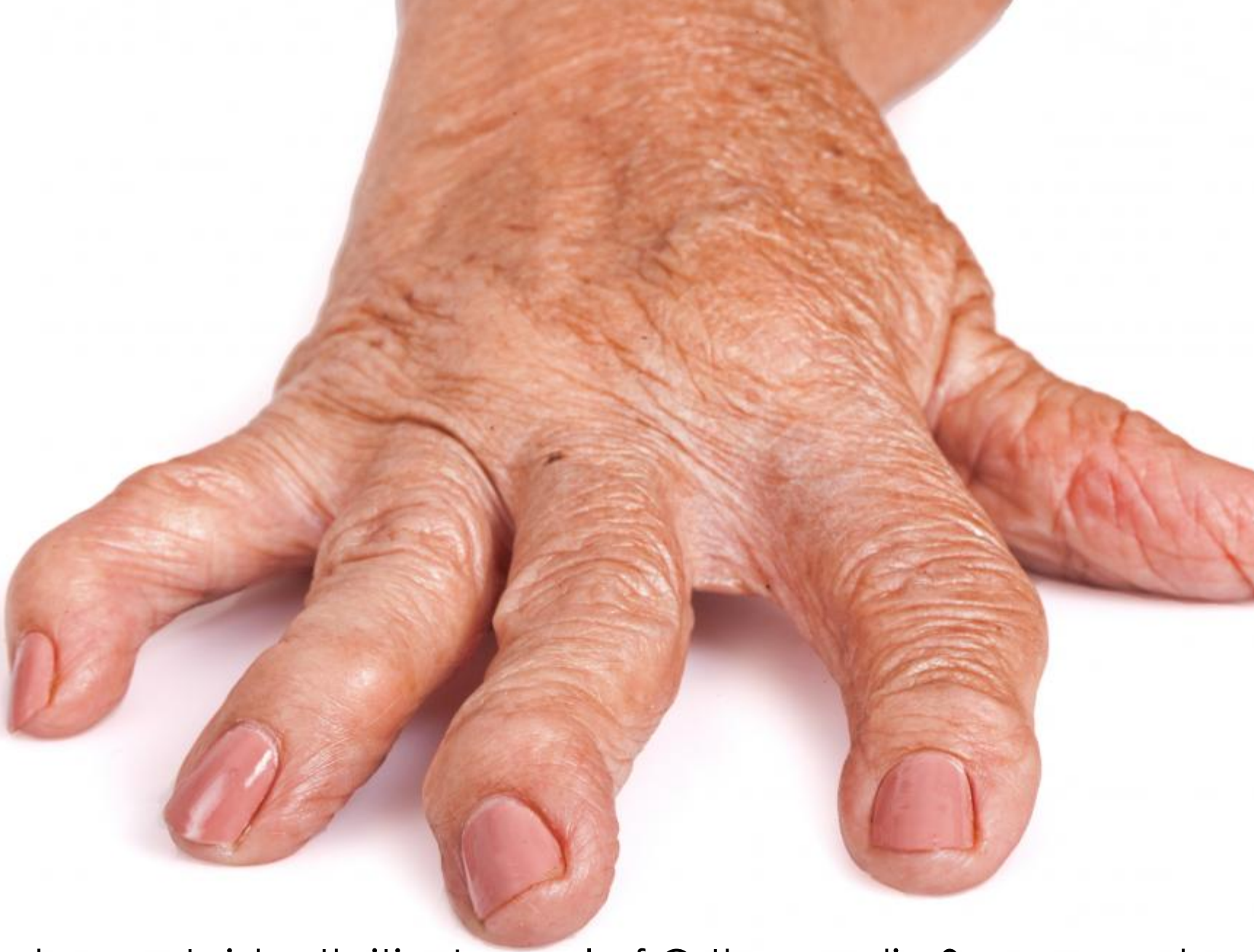
Morbilidad importante.

Peripheral Bacterial Septic Arthritis: Review of Diagnosis and Management, J Clin Rheumatol 2017.
Approach to Septic Arthritis. Am Fam Physician. 2011


HIGH
MED
RISK

10 veces población general

- Alteración función PMN.
- Alteraciones histológicas.
- Corticoides.
- Inmunosupresores.



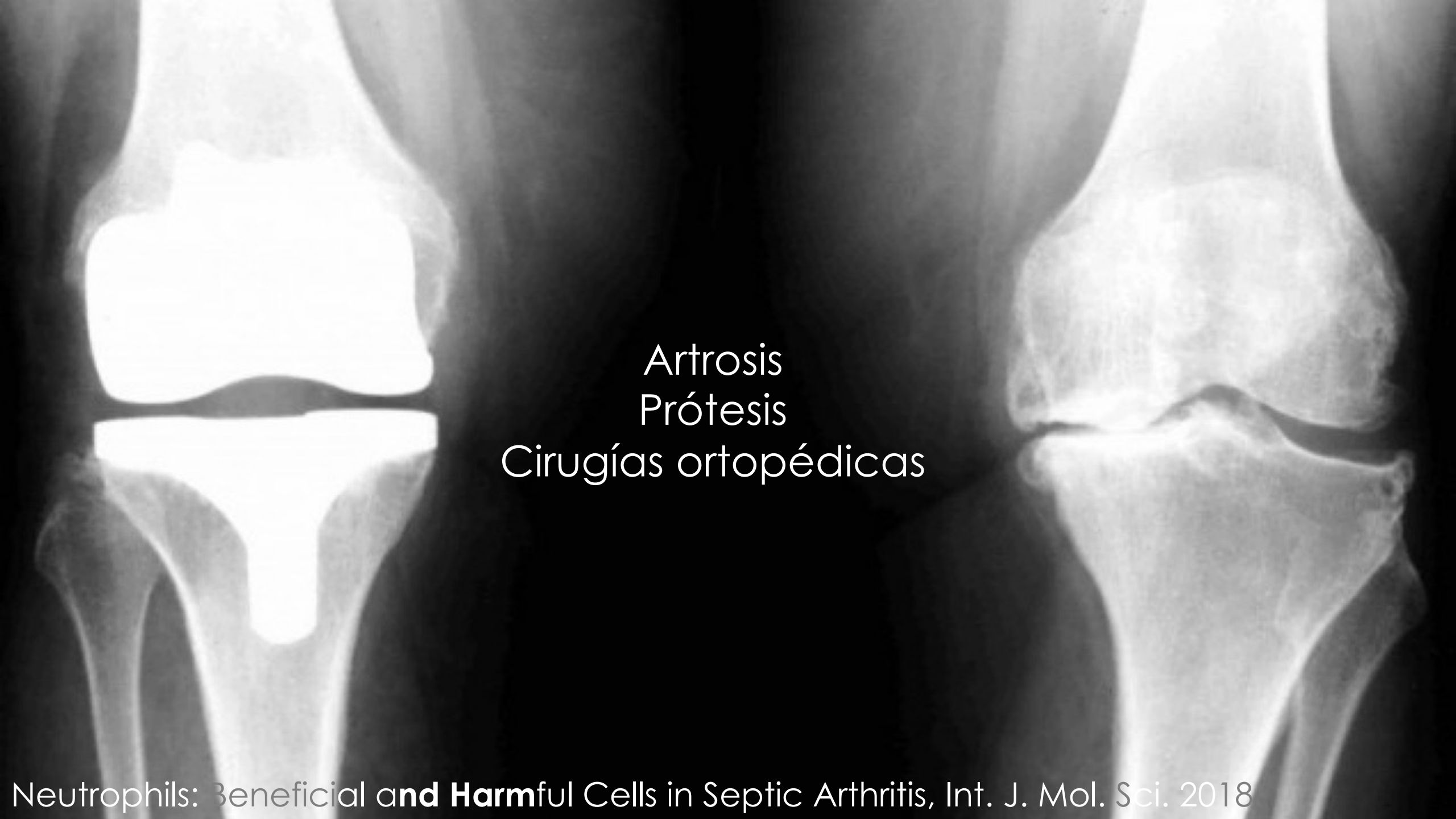
Septic arthritis in patients with rheumatoid arthritis, Journal of Orthopaedic Surgery and Research 2008.

Coexistencia en un 5%.

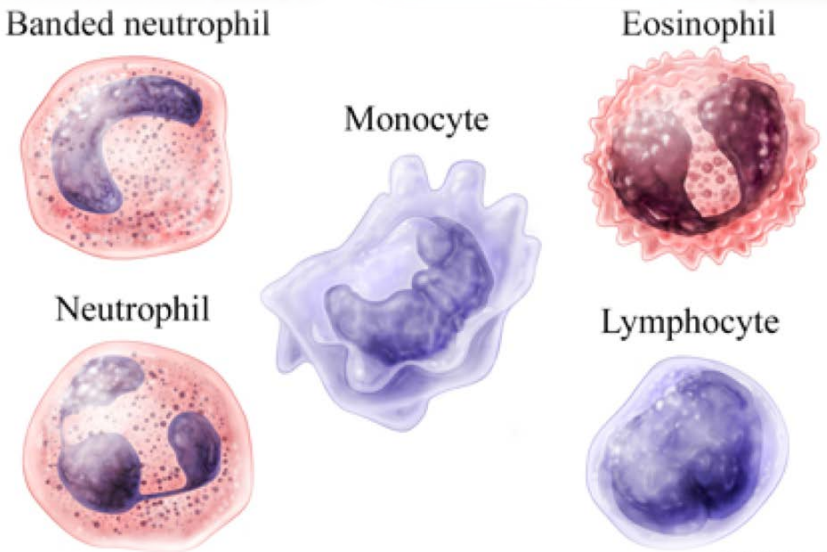
Más frecuente con pseudogota.

Concomitant Septic Arthritis in Crystal Monoarthritis, Rheumatol 2012;39;157-160


Neutrophils: Beneficial and Harmful Cells in Septic Arthritis, Int. J. Mol. Sci. 2018

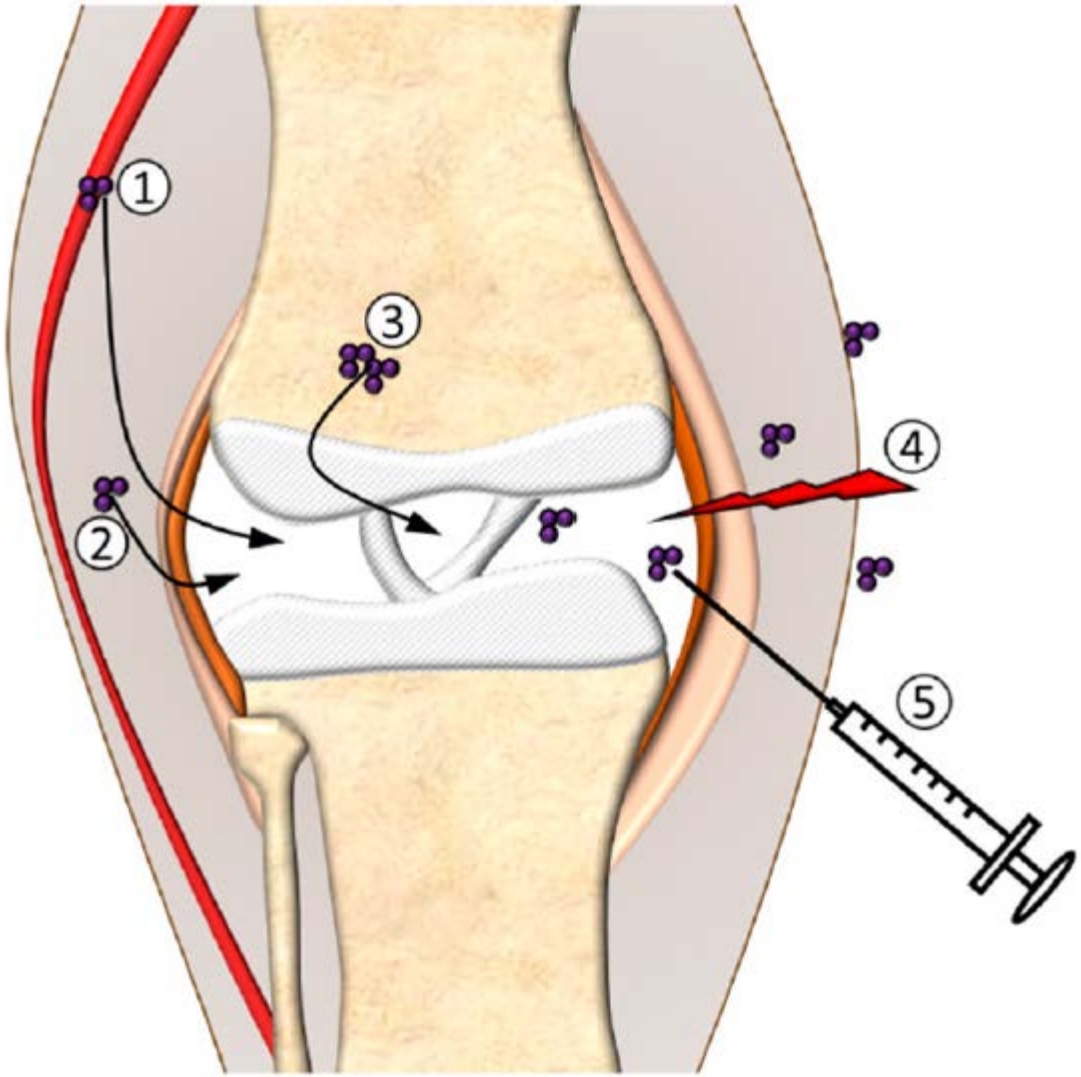



Neutrophils: Beneficial a**nd Harm**ful Cells in Septic Arthritis, Int. J. Mol. Sci. 2018

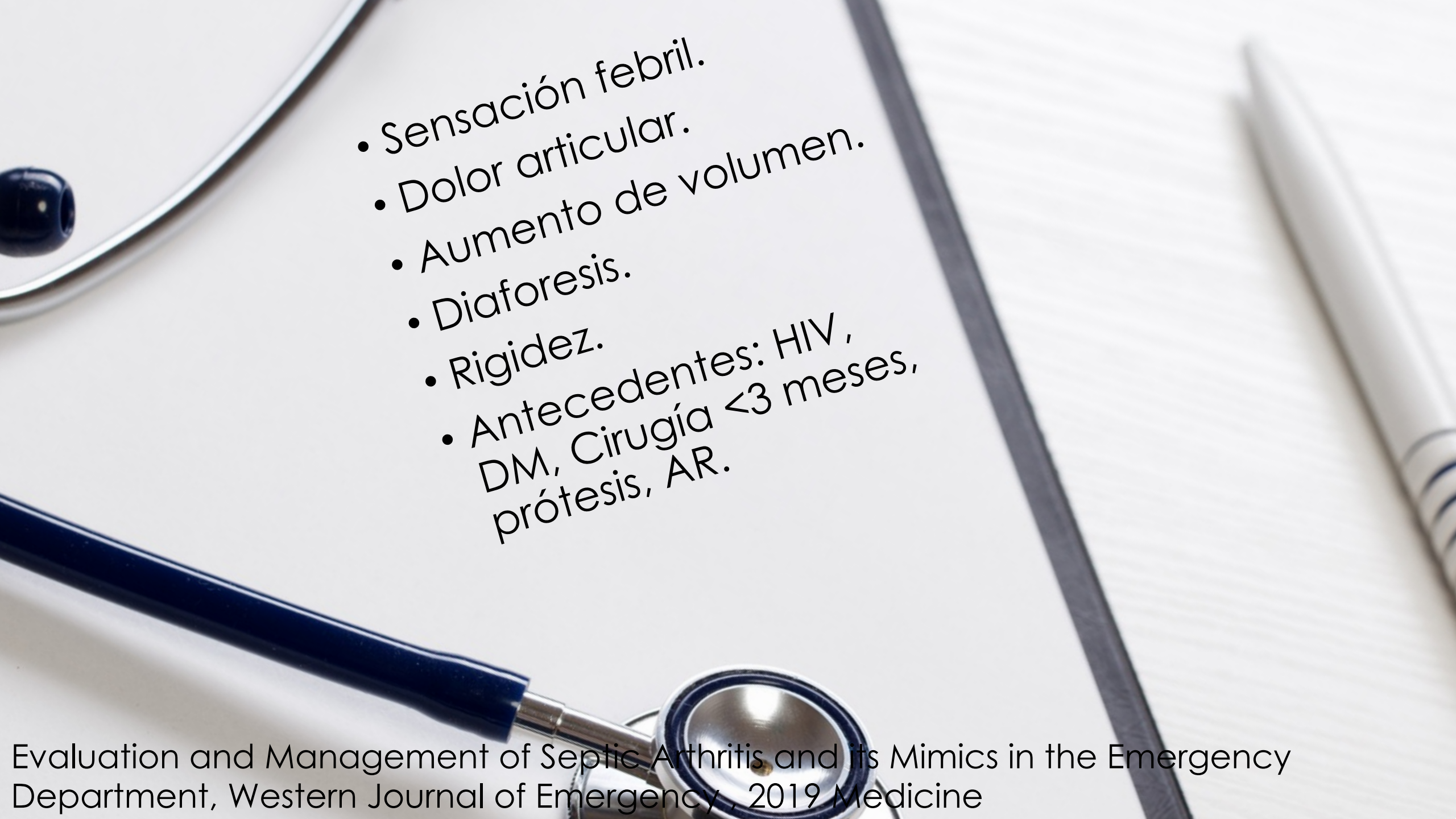



Neutrophils: Beneficial and Harmful Cells in Septic Arthritis, Int. J. Mol. Sci. 2018

1. Vía Hematógena
2. Infección adyacente
3. Osteomielitis contigua
4. Trauma directo
5. Procedimientos invasivos




Neutrophils: Beneficial and Harmful Cells in Septic Arthritis, Int. J. Mol. Sci. 2018

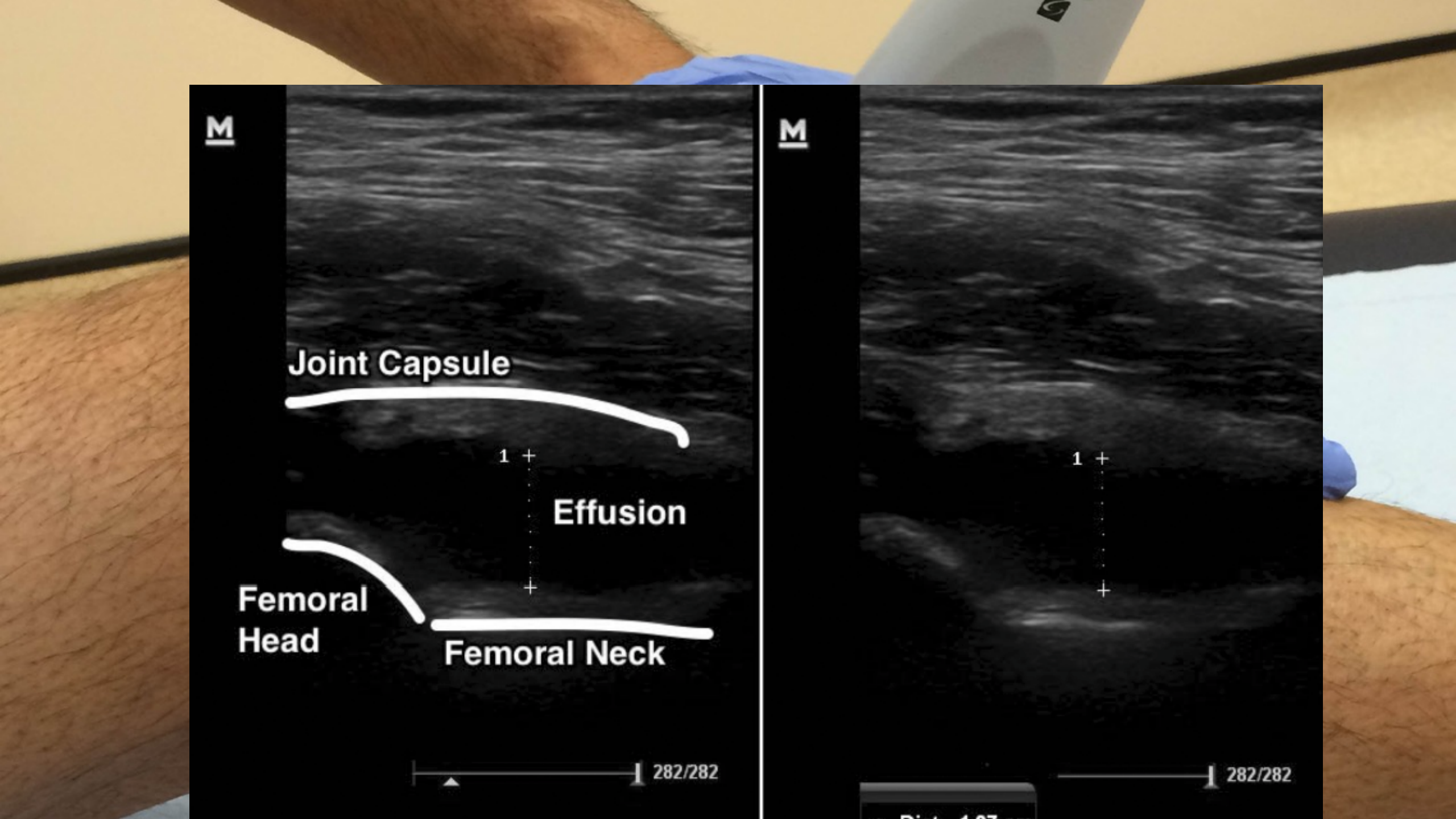



Evaluation and Management of Septic Arthritis and its Mimics in the Emergency Department, Western Journal of Emergency , 2019 Medicine

- Dolor a la movilización.
- Disminución rango articular
- Dolor a la palpación
- Derrame articular
- Tumefacción
- Dolor al aplicar carga

Evaluation and Management of Septic Arthritis and its Mimics in the Emergency Department, Western Journal of Emergency , 2019 Medicine


SIEMENS
SOMATOM
Definition Edge


M
Joint Capsule
1
Effusion
Femoral
Head
Femoral Neck
282/282
M
1
282/282

# Criterios modificados de Newman

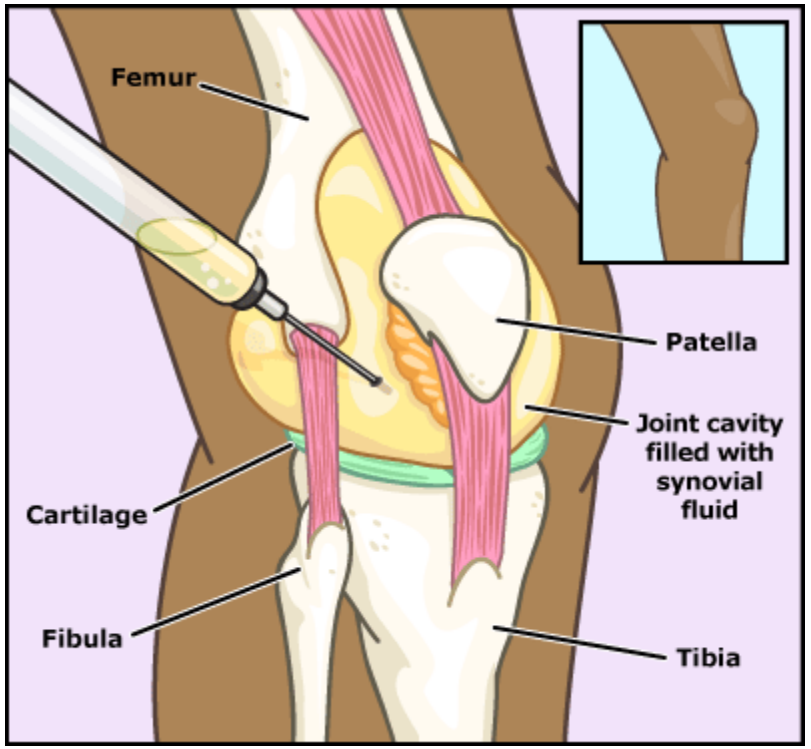
| | |
|---|---|
| Artritis séptica | Microorganismo obtenido de la articulación. |
| | Microorganismo en otro sitio, en contexto de artritis. |
| | Cuadro clínico típico, sin microorganismo, con líquido turbio o evidencia radiológica. |
| | Post Mortem. |

Bacterial septic arthritis in adults, Lancet 2010; 375: 846–55.


rtropatía por cristales
Artritis reumatológicas
Osteoartritis
Enfermedad de Lyme
Artritis reactiva

Con técnica aséptica y previamente anestesiando localmente al paciente.

- Aguja 18 y jeringa 60cc.
- 1 cm lateral o medial de la rótula y 1 cm superior, apuntando hacia posterior al espacio intercondíleo femoral.
- Aspirar la mayor cantidad de líquido posible.
- Por inferior, rodilla en 90°, 5 mm inferior al borde de la rótula, evitando el tendón, apuntando hacia el espacio intecondileo.
- Si es posible, asistencia ecográfica.




Knee Arthrocentesis, Halleh Akbarnia, December 16, 2018

# Ultrasound for Knee Effusion

# Knee Arthrocentesis

| | Normal | No inflamatoria | Inflamatoria | Cristales | Séptica | Gonocócica |
|---|---|---|---|---|---|---|
| Color | Claro | Blanquecino | Amarillo | Amarillo | Verdoso | Amarillo |
| Transparencia | Transparente | Transparente | Translucido | Translucido | Opaco | Opaco |
| Viscosidad | Alta | Alta | Baja | Baja | Baja | Muy baja |
| WBC | <200 | 200-2,000 | 2,000-100,000 | 2,000-100,000 | >50,000 | >34,000 |
| % PMN | <25 | <25 | >50 | >50 | >75 | >75% |
| Gram | | | | | 60-80% | <50% |
| Cultivo | | | | | >90% | 25-70% |
| Cristales | | | | + | Poco frecuente | |

Approach to Septic Arthritis. Am Fam Physician. 2011

RHEUMATOLOGY

Rheumatology 2019;58:1644–1648
doi:10.1093/rheumatology/kez098
Advance Access publication 28 March 2019

Concise report

# Calprotectin discriminates septic arthritis from pseudogout and rheumatoid arthritis

**Athan Baillet[1,2], Candice Trocmé[3,4], Xavier Romand[1], Chuong M.V. Nguyen[1,2], Anais Courtier[2], Bertrand Toussaint[3,4], Philippe Gaudin[1,2] and Olivier Epaulard[5,6]**

## Abstract

**Objective.** We aimed to determine whether calprotectin and α-defensins could discriminate septic from other inflammatory arthritides.

**Methods.** Synovial fluids with a predominance of neutrophils from patients with septic arthritis, pseudogout and RA were prospectively collected. Neutrophil-related proteins calprotectin and human neutrophil α-defensins levels were assessed in synovial fluids. Demographic parameters and biomarkers with *P*-value ⩽0.05 for differentiating septic from non-septic arthritis were included in a multivariable model. Multivariable logistic regression with stepwise selection was performed to build the final combined model.

**Results.** A total of 74 patients were included: septic arthritis ($n = 26$), pseudogout ($n = 28$) and RA ($n = 20$). Patients with septic arthritis were more likely to be male and young, and to display higher synovial neutrophil count. Calprotectin was significantly increased in patients with septic arthritis. The multivariable model included calprotectin, synovial fluid neutrophil count and gender. Calprotectin was the only biomarker that discriminated septic arthritis from non-septic inflammatory arthritides, with 76% sensitivity, 94% specificity and a positive likelihood ratio = 12.2 at the threshold for calprotectin of 150 mg/l.

**Conclusion.** Synovial fluid calprotectin is a relevant biomarker to discriminate septic arthritis from other inflammatory arthritides. This biomarker should be tested in an independent cohort.

N: 74
26: Artritis séptica
28: pseudogota
20: AR

Corte 52mg/L:
S 96% E 44% VPP 47% VPN 95%

Corte 150mg/L:
S 76% E 94% VPP 86% VPN 88%

Resultados similares en prótesis.

*Sin cálculo de S con %PMN ni con recuento de WBC.

56% estafilococos.

16% Estreptococos.

15% BGN.

5% polimicrobiano.

Micobacterias, gonococo, brúcela, otros.

Evaluation and Management of Septic Arthritis and its Mimics in the Emergency Department, Western Journal of Emergency Medicine, March 2019

**Tabla 6. Hallazgos microbiológicos en 25 eventos de artritis séptica. Hospital Militar de Santiago, 2003-2013**

| Agente involucrado | n | % | Comentarios |
|---|---|---|---|
| Grampositivos | | | |
| *Staphylococcus aureus* | 13 | 48,1 | 3 cepas con resistencia a cloxacilina |
| *Streptococcus agalactiae* | 2 | 7,4 | |
| *Staphylococcus capitis* | 1 | 3,7 | |
| *Staphylococcus epidermidis* | 1 | 3,7 | 1 cepa con resistencia a cloxacilina |
| *Enterococcus faecalis* | 1 | 3,7 | |
| *Streptococcus mutans* | 1 | 3,7 | |
| *Streptococcus pyogenes* | 1 | 3,7 | |
| *Streptococcus salivarius* | 1 | 3,7 | |
| *Streptococcus* grupo G | 1 | 3,7 | |
| Subtotal | 22 | 81,5 | |
| Gramnegativos | | | |
| *Pseudomonas aeruginosa* | 3 | 11,1 | Hospitalización reciente o cirugía articular previa |
| *Acinetobacter baumannii* | 1 | 3,7 | Hospitalización reciente |
| *Escherichia coli* | 1 | 3,7 | |
| Subtotal | 5 | 18,5 | |

Artritis séptica en pacientes adultos en un hospital general de Chile, Rev Chilena Infectol 2014; 31 (4): 435-443

| Cuadro clínico | Articulación comprometida | Patógeno |
|---|---|---|
| Tanque de pescados | Dedos y muñecas | Mycobacterium marinum |
| Mordedura perro/gato | Dedos y tobillos | Pasteurella multocida,<br>Capnocytophaga spp |
| Productos no pasteurizados | Sacroiliaca | Brucella spp |
| Drogas EV | Axiales | Pseudomona aeruginosa<br>Staphylococcus aureus |
| Clavos | Pie | Pseudomona aeruginosa |
| Actividad sexual | Manos, muñecas y tobillos | Neisseria gonorrhoeae |
| Jardineros | Rodilla, tobillo u hombro | Nocardia spp<br>Pantoea agglomerans<br>Sporothrix schenckii |
| LES | ---------- | Neisseria gonorrhoeae<br>Proteus spp<br>Salmonella spp |

Approach to Septic Arthritis. Am Fam Physician. 2011


Drenaje
Antibióticos
Cirugía

Sin factores de riesgo: Cefazolina 2gr cada 8 horas.

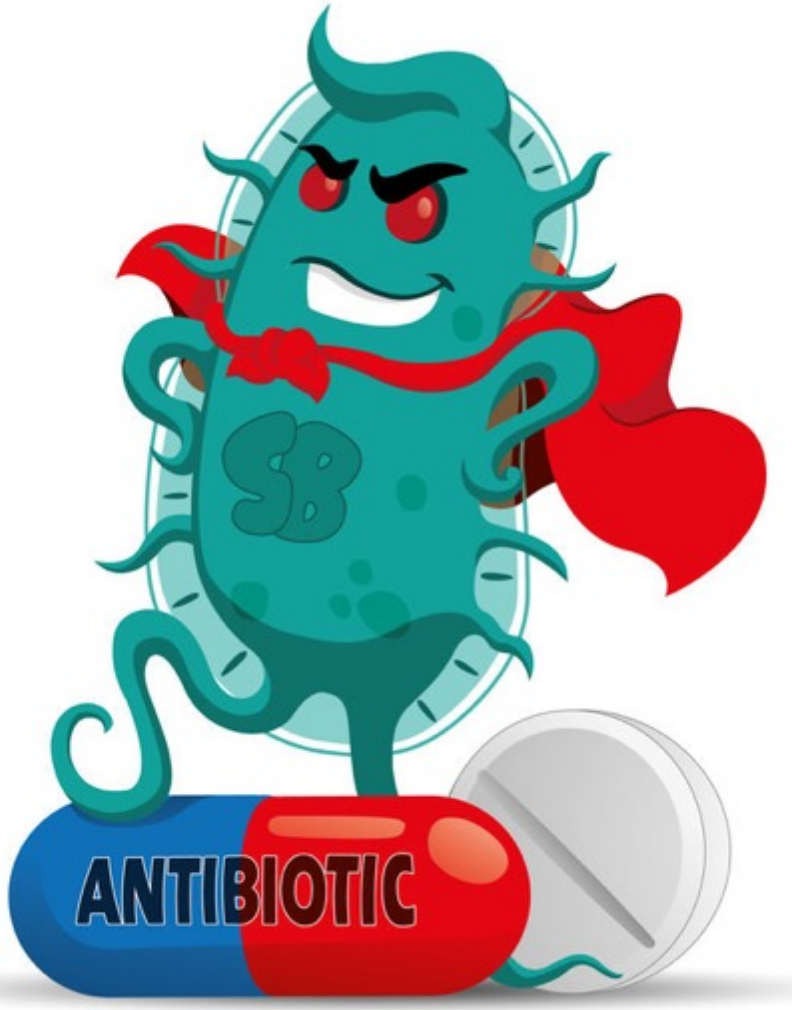
Riesgo BGN: Ceftriaxona 2gr al día.

Riesgo SAMR: Vancomicina 25mg/kg carga, luego niveles para 15-20 ug/ml.

Gonococo: Ceftriaxona 1gr al día.
(adulto joven, antecedentes ITS).

Sospecha Pseudomonas: Ceftazidima +/- segundo agente.

Sospecha bacterias BLEE: Carbapenémicos.




Clinical Guidelines for the Antimicrobial Treatment of Bone and Joint Infections in Korea, Infect Chemother. 2014 Jun

Contents lists available at SciVerse ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid

Retrospectivo (N 169).
<14 <15-28 >28
Sin diferencia en: mortalidad, recurrencia o secuela.

Diferencia: falta de intervención, gram negativos e inmunosupresión.

## Short parenteral antibiotic treatment for adult septic arthritis after successful drainage☆

Ilker Uçkay [a,b,*], Luisa Tovmirzaeva [b], Jorge Garbino [b], Peter Rohner [c], Phedon Tahintzi [c], Domizio Suvà [a], Mathieu Assal [a], Pierre Hoffmeyer [a], Louis Bernard [a,d], Daniel Lew [b]

[a] Orthopedic Surgery Service, Geneva University Hospitals and Faculty of Medicine, University of Geneva, 4, Rue Gabrielle Perret-Gentil, 1211 Geneva 14, Switzerland
[b] Infectious Diseases Service, Geneva University Hospitals and Faculty of Medicine, University of Geneva, Geneva, Switzerland
[c] Coding Office, Geneva University Hospitals and Faculty of Medicine, University of Geneva, Geneva, Switzerland
[d] Infectious Diseases Service, Bretonneau Hospital, CHU Tours, Tours, France

No inferioridad (N 154).
2 vs 4 semanas post drenaje quirúrgico.

Sin diferencias en cura o secuelas.

Media de ATB endovenosos 1 y 2 días.

CLINICAL SCIENCE

## Two weeks versus four weeks of antibiotic therapy after surgical drainage for native joint bacterial arthritis: a prospective, randomised, non-inferiority trial

Ergys Gjika,[1] Jean-Yves Beaulieu,[1] Konstantinos Vakalopoulos,[1] Morgan Gauthier,[1] Cindy Bouvet,[1] Amanda Gonzalez,[1] Vanessa Morello,[1] Christina Steiger,[1] Stefanie Hirsiger,[1] Benjamin Alan Lipsky,[2,3] Ilker Uçkay[2,4]

# Artrocentesis vs abordaje quirúrgico

- No hay recomendaciones al respecto.
- Estudios demuestran eficacia similar.
- Evidencia contradictoria en artrotomía vs artroscopia, resultados similares.
- Artrocentesis cada 24-48 horas, alternativa razonable en articulaciones grandes.

**TABLE II Age and Sex-Specific Annual Incidence of Osteomyelitis in Olmsted County (1969-2009)**

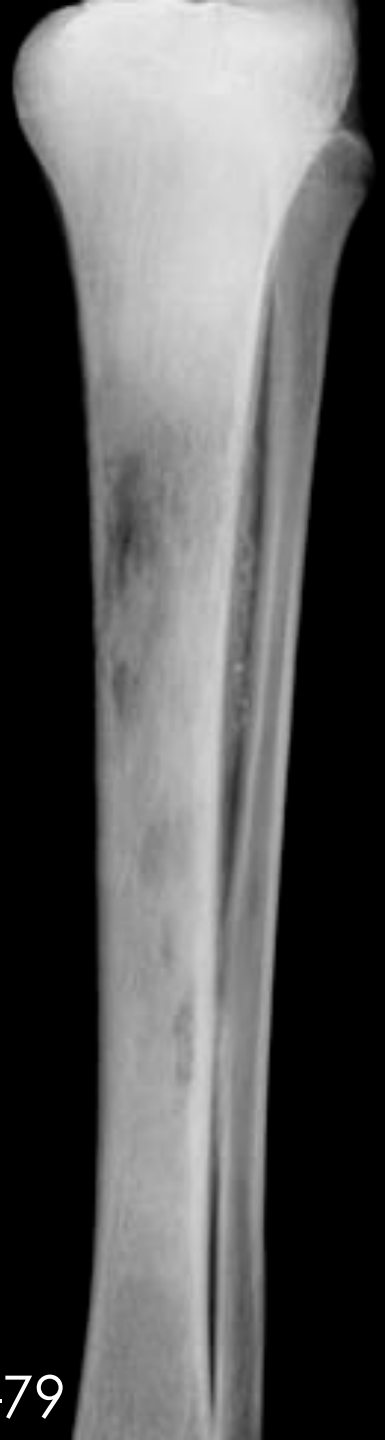
| Age Group (yr) | No. of Cases | | | Incidence Rate* (per 100,000 person-years) | | |
|---|---|---|---|---|---|---|
| | Female | Male | Total | Female | Male | Total |
| <18 | 41 | 71 | 112 | 6.6 | 10.9 | 8.8 |
| 18-29 | 22 | 42 | 64 | 5.0 | 10.9 | 7.8 |
| 30-39 | 20 | 46 | 66 | 5.7 | 13.2 | 9.4 |
| 40-49 | 20 | 40 | 60 | 6.8 | 14.0 | 10.4 |
| 50-59 | 46 | 71 | 117 | 20.8 | 33.5 | 27.0 |
| 60-69 | 52 | 67 | 119 | 33.4 | 49.2 | 40.8 |
| 70-79 | 57 | 54 | 111 | 49.4 | 66.7 | 56.5 |
| ≥80 | 61 | 50 | 111 | 70.3 | 128.4 | 88.3 |
| Total | 319 | 441 | 760 | 16.7 (14.8, 18.6) | 27.7 (24.9, 30.5) | 21.8 (20.2, 23.4) |

*Values in parentheses are the 95% CI.

Incidencia 21,8 x 100,000.

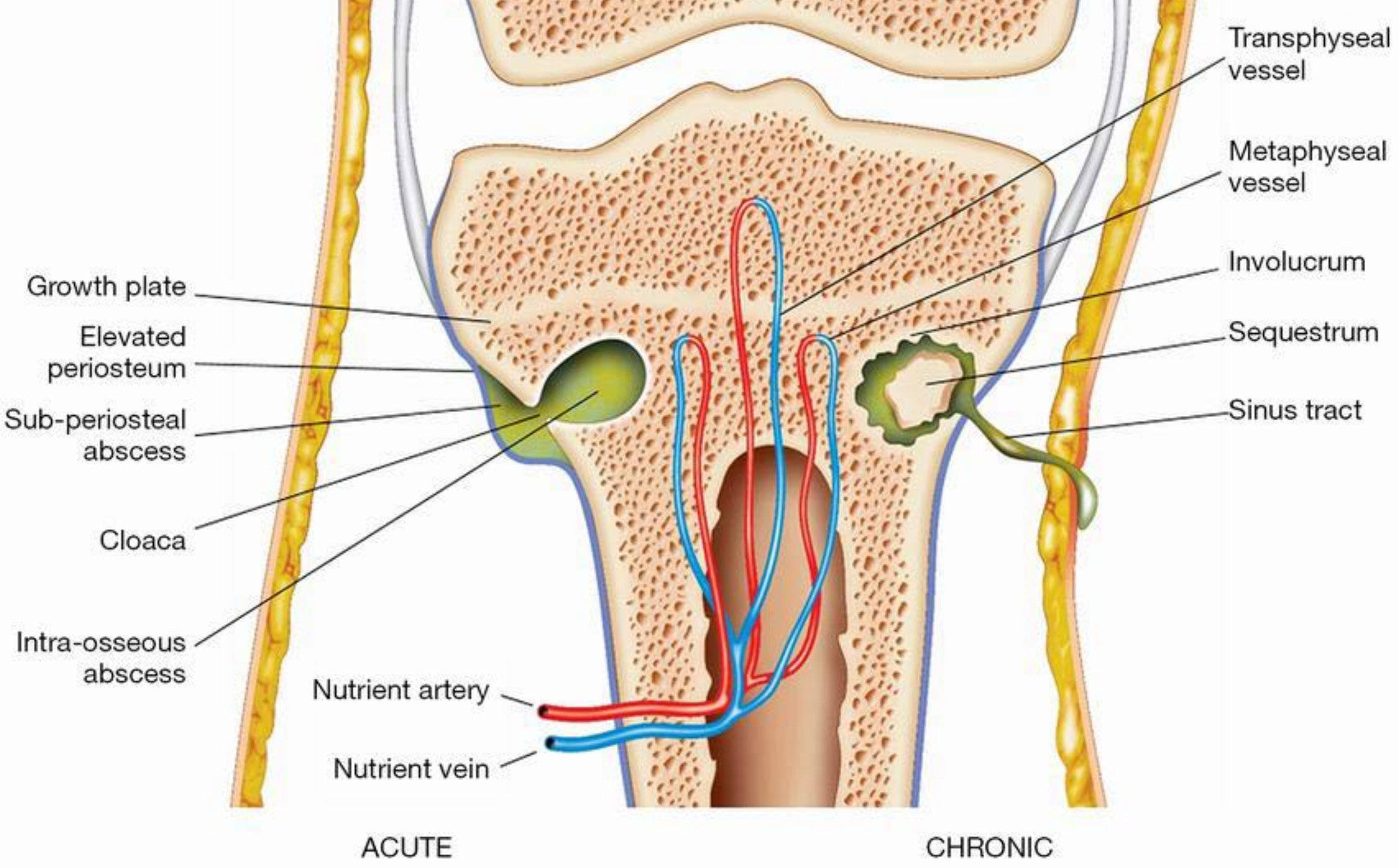
Trends in the Epidemiology of Osteomyelitis. A Population-Based Study, 1969 to 2009. J Bone Joint Surg Am. 2015;

Inoculación directa o por contigüidad



Diseminación hematógena

Osteomyelitis, Lancet 2004; 364: 369–79


Transphyseal vessel
Metaphyseal vessel
Involucrum
Sequestrum
Sinus tract
Growth plate
Elevated periosteum
Sub-periosteal abscess
Cloaca
Intra-osseous abscess
Nutrient artery
Nutrient vein
ACUTE
CHRONIC


RISK
FACTORS

Endocarditis

Dispositivos endovasculares

Elementos ortopédicos

Drogas endovenosas

Hemodiálisis

Enfermedad de células falciformes

Neoplasias

Estados de inmunosupresión

Fracturas abierta

Cirugías recientes

Diabetes Mellitus

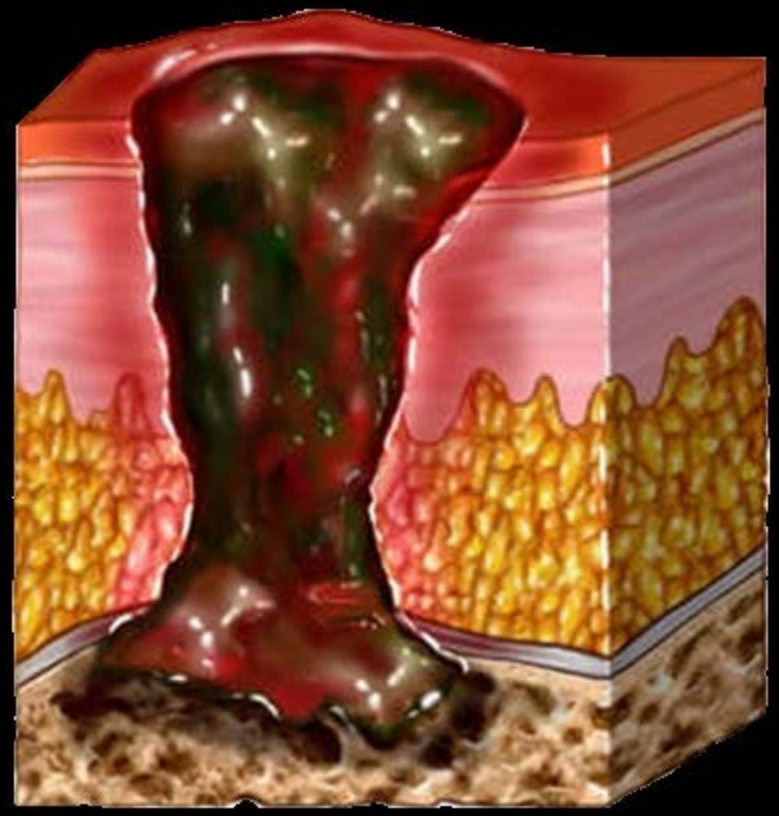
Heridas crónicas

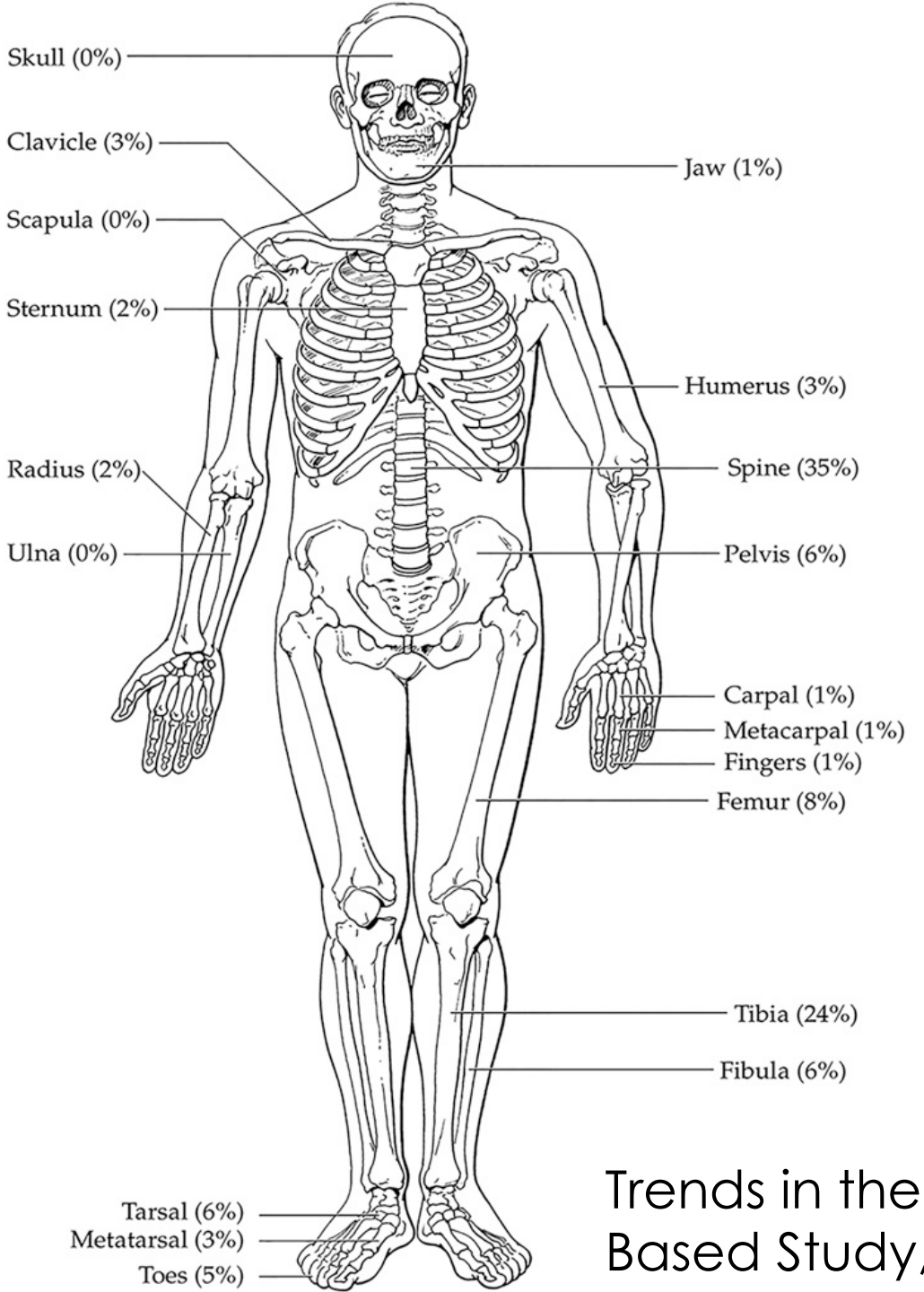
Neuropatía periférica

Enfermedad vascular periférica

Elementos ortopédicos

Estados de inmunosupresión

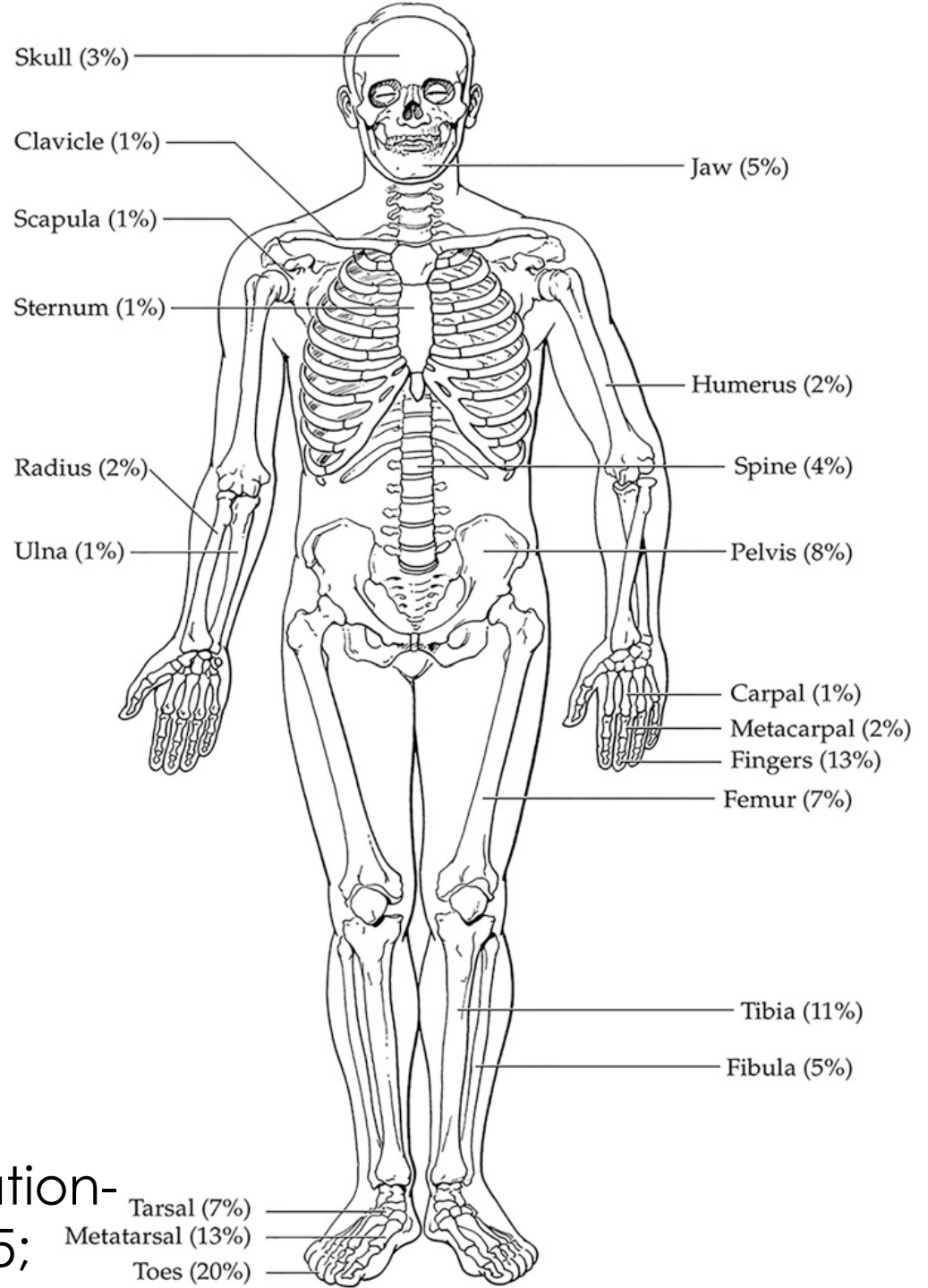




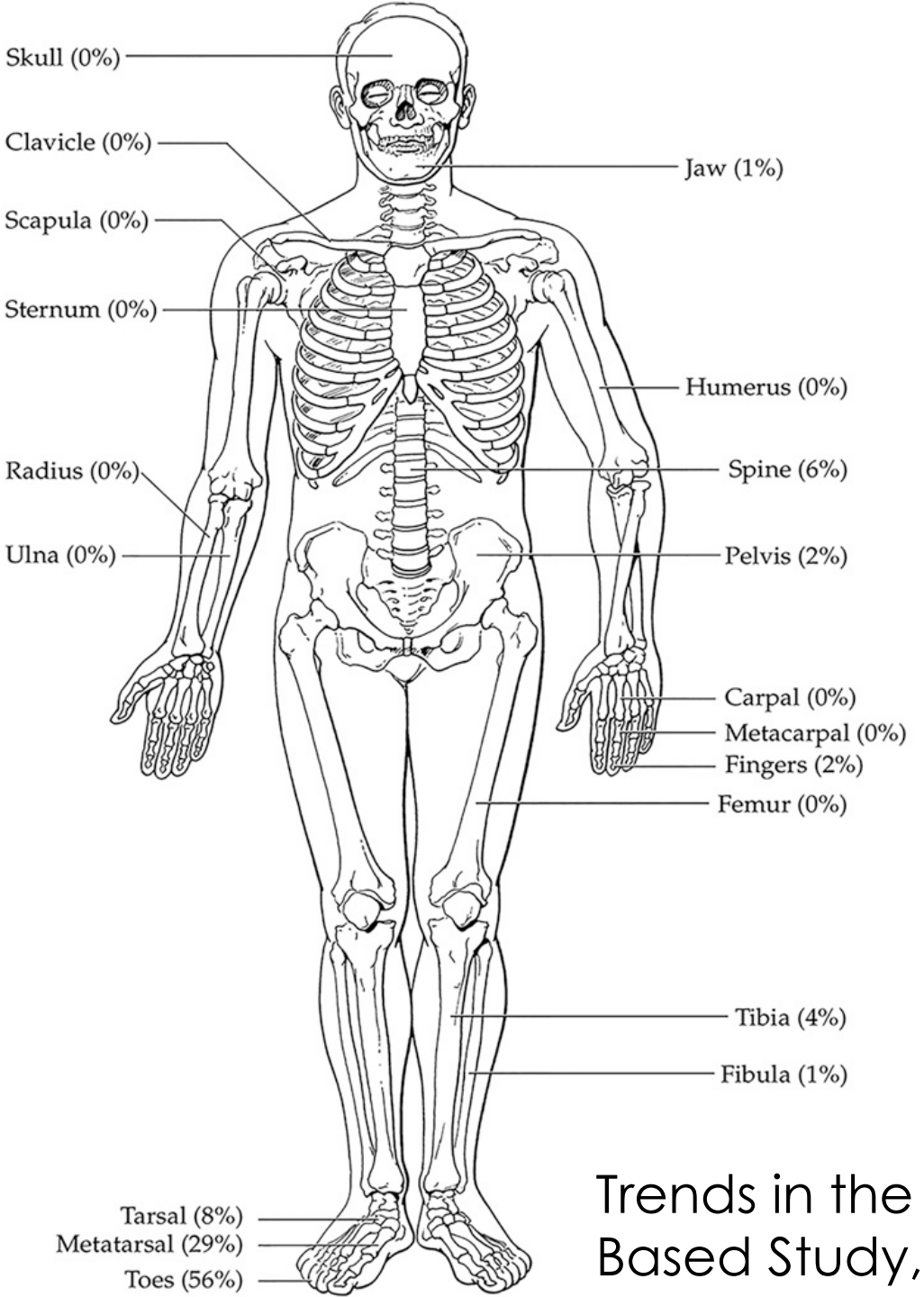

| Hematógena | |
|---|---|
| **Hueso** | **Frecuencia** |
| Columna | 35% |
| Tibia | 24% |
| Fémur | 8% |
| Pelvis | 6% |
| Tarso | 6% |
| Peroné | 6% |
| Falanges pies | 5% |

Trends in the Epidemiology of Osteomyelitis. A Population-Based Study, 1969 to 2009. J Bone Joint Surg Am. 2015;

| Contigüidad | |
|---|---|
| **Hueso** | **Frecuencia** |
| **Falanges pies** | **20%** |
| **Metatarsos** | **13%** |
| **Falanges manos** | **13%** |
| **Tibia** | **11%** |
| **Pelvis** | **8%** |
| **Fémur** | **7%** |
| **Tarso** | **7%** |




Trends in the Epidemiology of Osteomyelitis. A Population-Based Study, 1969 to 2009. J Bone Joint Surg Am. 2015;




| Diabéticos | |
|---|---|
| **Hueso** | **Frecuencia** |
| **Falanges pies** | **35%** |
| **Metatarso** | **24%** |
| **Tarso** | **8%** |
| **Columna** | **6%** |
| **Tibia** | **6%** |
| **Pelvis** | **6%** |
| **Falanges manos** | **5%** |

Trends in the Epidemiology of Osteomyelitis. A Population-Based Study, 1969 to 2009. J Bone Joint Surg Am. 2015;


Osteomyelitis, BMJ Best Practice, Jun 06, 2018

- Eritema.
- Cicatrices.
- Limitación de la movilización
- Deformidad.
- Sensibilidad a la percusión.
- Dolor a lo largo de la columna.
- Salida de pus por trayecto fistuloso.

Osteomyelitis, BMJ Best Practice, Jun 06, 2018

Tardía

S 14-54% E 68-70E

Descartar otras patologías


S 67% E 50%

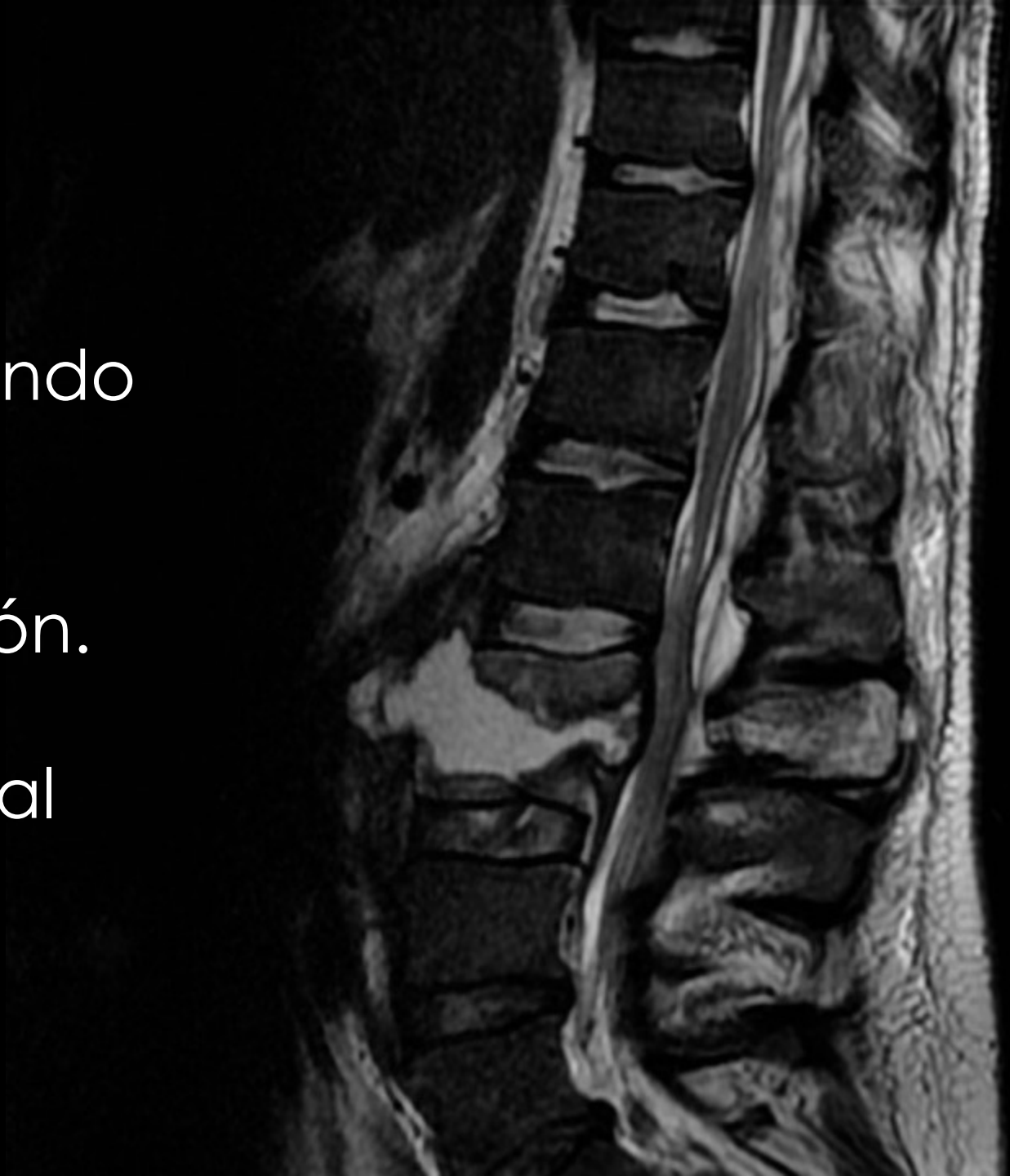
No debe usarse de rutina

S 78-90% E 60-90%

Diferencia tejido blando de óseo.

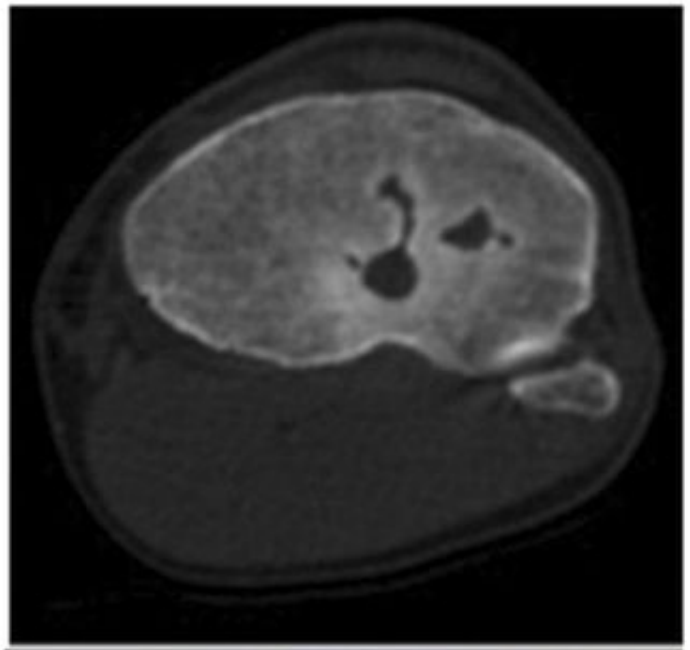
Extensión de infección.

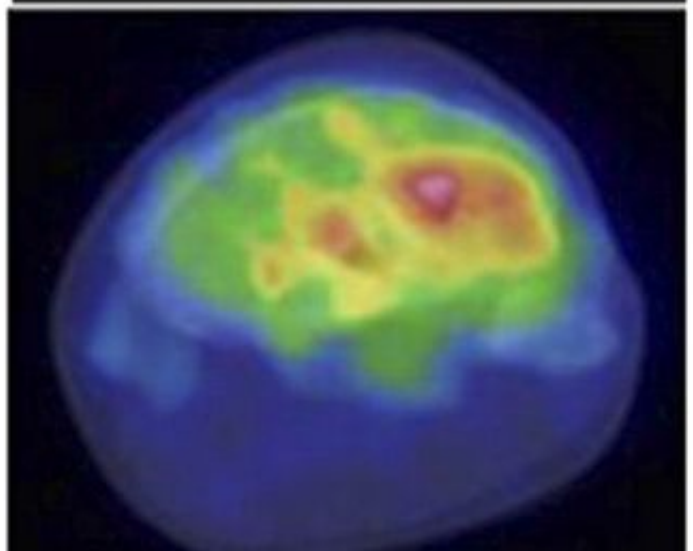
Poco útil con material ortopédico.

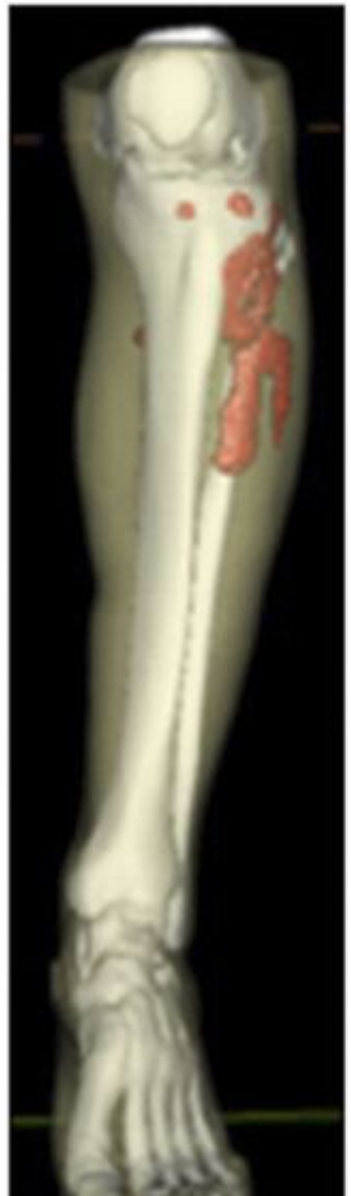


Radiograph

$^{68}$Ga-citrate PET/CT

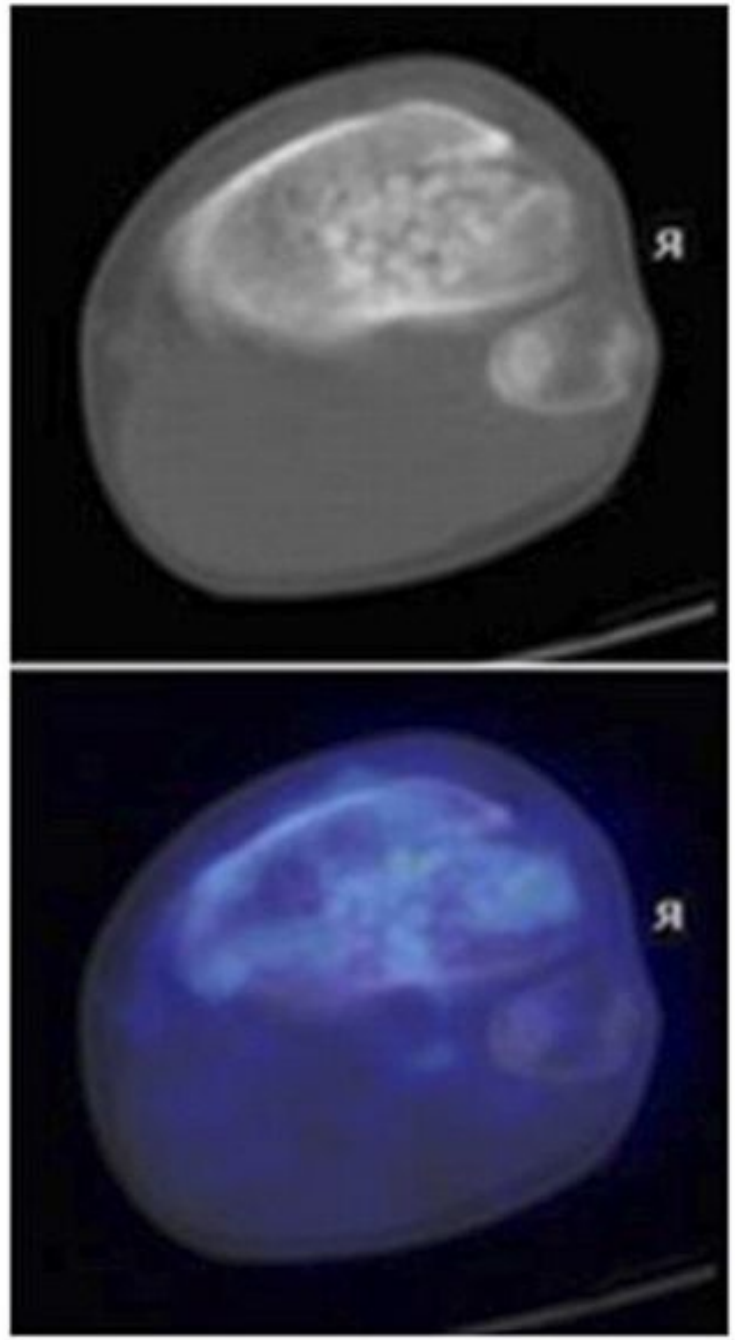


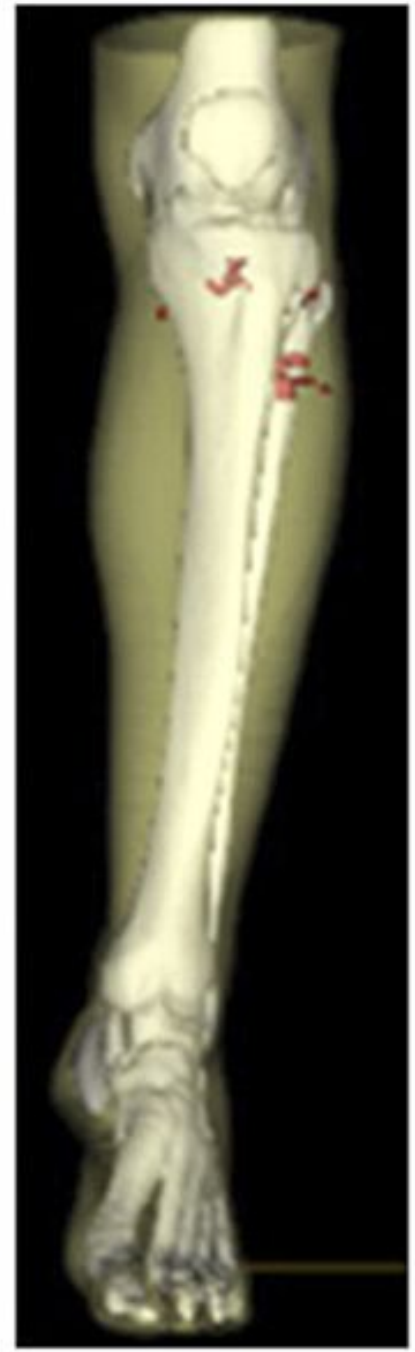




S 96%
E 91%

Before therapy





After therapy

## Table 2. Diagnostic Imaging Studies for Osteomyelitis

| *Imaging modality* | *Sensitivity (%)* | *Specificity (%)* | *Comments* |
|---|---|---|---|
| Computed tomography | 67 | 50 | Generally should not be used in osteomyelitis evaluation |
| Leukocyte scintigraphy | 61 to 84 | 60 to 68 | Combining with technetium-99 bone scintigraphy can increase specificity |
| Magnetic resonance imaging | 78 to 90 | 60 to 90 | Useful to distinguish between soft tissue and bone infection, and to determine extent of infection; less useful in locations of surgical hardware because of image distortion |
| Plain radiography (anteroposterior, lateral, and oblique views) | 14 to 54 | 68 to 70 | Preferred imaging modality; useful to rule out other pathology |
| Positron emission tomography | 96 | 91 | Expensive; limited availability |
| Technetium-99 bone scintigraphy | 82 | 25 | Low specificity, especially if patient has had recent trauma or surgery; useful to differentiate osteomyelitis from cellulitis, and in patients in whom magnetic resonance imaging is contraindicated |

*Information from references 24 through 30.*

Diagnosis and Management of Osteomyelitis. American Academy of Family Physicians. November 1, 2011

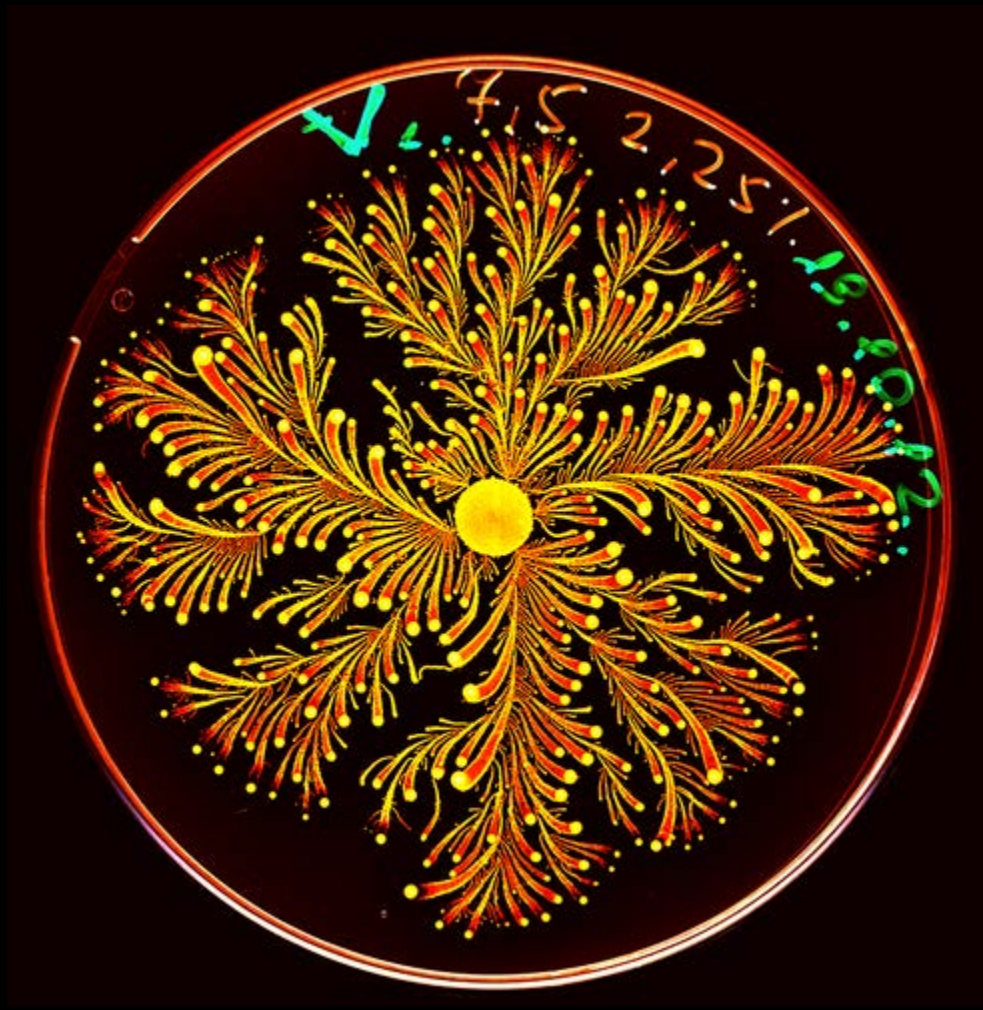

Imágenes
Laboratorio
Microbiología
Cuadro clínico
Histopatología
Osteomielitis

10-25% Sin identificación

Polimicrobiano 30-60%

>75% cocos gram (+)

40-50% estafilococo aureus



Trends in the Epidemiology of Osteomyelitis. A Population-Based Study, 1969 to 2009. J Bone Joint Surg Am. 2015;
Etiologic Diagnosis of Chronic Osteomyelitis. ARCH INTERN MED/VOL 166, JAN 9, 2006

| Most common clinical association | Microorganism |
|---|---|
| Frequent microorganism in any type of osteomyelitis | *Staphylococcus aureus* (susceptible or resistant to meticillin) |
| Foreign-body-associated infection | Coagulase-negative staphylococci or *Propionibacterium* spp |
| Common in nosocomial infections | *Enterobacteriaceae*, *Pseudomonas aeruginosa*, *Candida* spp |
| Associated with bites, diabetic foot lesions, and decubitus ulcers | Streptococci and/or anaerobic bacteria |
| Sickle-cell disease | *Salmonella* spp or *Streptococcus pneumoniae* |
| HIV infection | *Bartonella henselae* or *B quintana* |
| Human or animal bites | *Pasteurella multocida* or *Eikenella corrodens* |
| Immunocompromised patients | *Aspergillus* spp, *Candida albicans*, or *Mycobacteria* spp |
| Populations in which tuberculosis is prevalent | *Mycobacterium tuberculosis* |
| Populations in which these pathogens are endemic | *Brucella* spp, *Coxiella burnetii*, fungi found in specific geographical areas (coccidiodomycosis, blastomycosis, histoplasmosis) |

***Table 1:*** **Microorganisms isolated from patients with osteomyelitis and their clinical associations**

Osteomyelitis, Lancet 2004; 364: 369–79

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ORIGINAL ARTICLE

# Oral versus Intravenous Antibiotics for Bone and Joint Infection

H.-K. Li, I. Rombach, R. Zambellas, A.S. Walker, M.A. McNally, B.L. Atkins, B.A. Lipsky, H.C. Hughes, D. Bose, M. Kümin, C. Scarborough, P.C. Matthews, A.J. Brent, J. Lomas, R. Gundle, M. Rogers, A. Taylor, B. Angus, I. Byren, A.R. Berendt, S. Warren, F.E. Fitzgerald, D.J.F. Mack, S. Hopkins, J. Folb, H.E. Reynolds, E. Moore, J. Marshall, N. Jenkins, C.E. Moran, A.F. Woodhouse, S. Stafford, R.A. Seaton, C. Vallance, C.J. Hemsley, K. Bisnauthsing, J.A.T. Sandoe, I. Aggarwal, S.C. Ellis, D.J. Bunn, R.K. Sutherland, G. Barlow, C. Cooper, C. Geue, N. McMeekin, A.H. Briggs, P. Sendi, E. Khatamzas, T. Wangrangsimakul, T.H.N. Wong, L.K. Barrett, A. Alvand, C.F. Old, J. Bostock, J. Paul, G. Cooke, G.E. Thwaites, P. Bejon, and M. Scarborough, for the OVIVA Trial Collaborators*

unnecessarily prolonged treatment, defining the optimal route and duration of antibiotic therapy and the role of surgical debridement in treating chronic osteomyelitis are important, unmet needs.

| Subgroup | Oral Group | Intravenous Group | Risk Difference (90% CI; 95% CI) |
|---|---|---|---|
| | *patients with treatment failure/ total no. of participants* | | |
| Intention-to-treat population | 70.0/527 | 77.3/527 | –1.4 (–4.9 to 2.2; –5.6 to 2.9) |
| Modified intention-to-treat population | 67/509 | 74/506 | –1.5 (–5.0 to 2.1; –5.7 to 2.8) |
| Per-protocol population | 61/466 | 69/443 | –2.5 (–6.3 to 1.3; –7.0 to 2.1) |
| Worst-case sensitivity analysis | 85/527 | 74/527 | 2.1 (–1.5 to 5.7; –2.2 to 6.4) |

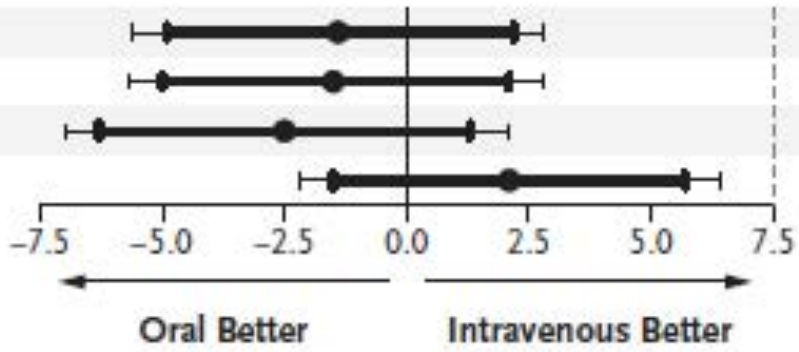


**Figure 3. Differences in Risk According to the Analysis Performed.**

The point estimates for the differences in failure rates are shown with 90% (thick lines) and 95% (thin lines) two-sided confidence intervals. The noninferiority margin is indicated by the vertical dashed line. The use of two-sided 90% confidence intervals was prespecified in the trial protocol in accordance with the sample-size calculation. Because two-sided 95% confidence intervals are also now commonly included in noninferiority trials, they are shown here to assess the sensitivity of the results to a change in significance level. In the intention-to-treat population, missing data were imputed with the use of multiple imputation by chained equations. The modified intention-to-treat population included only the participants with complete end-point data. The worst-case sensitivity analysis shows the results based on the worst-case assumption that, for participants with missing data, all participants who were randomly assigned to receive oral therapy and no participants who were randomly assigned to receive intravenous therapy had definitive treatment failures, thus introducing the worst possible bias against the oral strategy.

*Clinical Infectious Diseases*

MAJOR ARTICLE

# Optimal Duration of Antibiotic Therapy in Patients With Hematogenous Vertebral Osteomyelitis at Low Risk and High Risk of Recurrence

**Ki-Ho Park,[1] Oh-Hyun Cho,[2] Jung Hee Lee,[3] Ji Seon Park,[4] Kyung Nam Ryu,[4] Seong Yeon Park,[5] Yu-Mi Lee,[6] Yong Pil Chong,[7] Sung-Han Kim,[7] Sang-Oh Lee,[7] Sang-Ho Choi,[7] In-Gyu Bae,[2] Yang Soo Kim,[7] Jun Hee Woo,[7] and Mi Suk Lee[1]**

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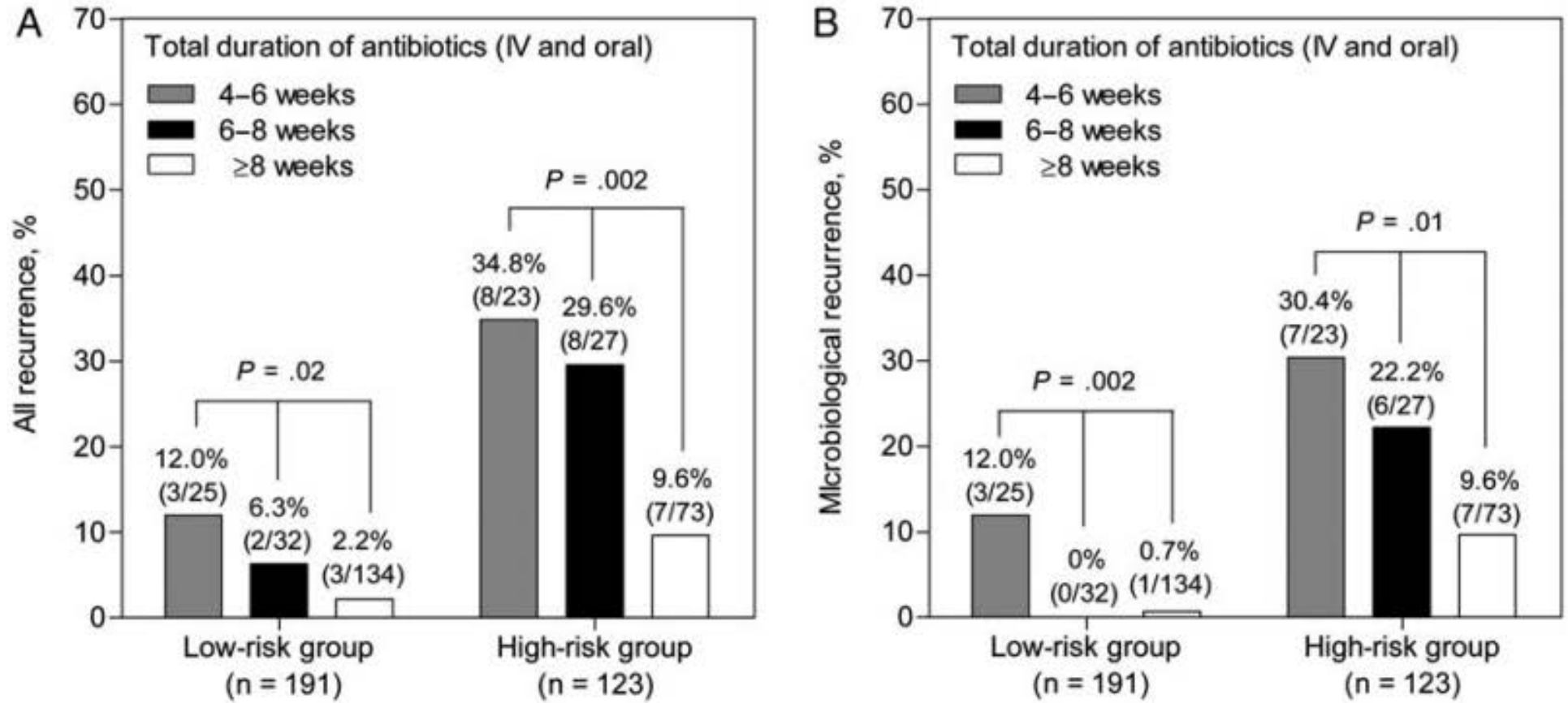


**Figure 2.** Recurrence rates of hematogenous vertebral osteomyelitis in patients at low and high risk of recurrence according to the total duration of antibiotic therapy (intravenous [IV] and oral). *A*, All recurrence rates, including both microbiological and clinical recurrence. *B*, Microbiological recurrence rates. Patients with no and any independent baseline risk factors for recurrence were considered as being at low and high risk of recurrence, respectively. Independent baseline risk factors identified by multivariable analysis were methicillin-resistant *Staphylococcus aureus* infection, undrained paravertebral/psoas abscess, and end-stage renal disease.

Gracias