Appropriate imaging, such as magnetic resonance imaging (MRI), should also be part of the work up since this allows for localization of the infection and determination of the extent of disease. MRI may also help with surgical planning to ensure a more thorough debridement and decompression of infected areas [10,15,16].

Images may also reveal subperiosteal abscess formation or the presence of SA in the hip. The presence of such findings lead to the need for early surgical intervention since antibiotics cannot typically penetrate large abscess cavities. Compared to MSSA infections, MRSA infections are more invasive and have a higher rates of abscess formation. Thus, they require surgical intervention more frequently and a higher number of repeat procedures [5].

Aggressive surgical management during the initial procedure, involving opening a surgical window and intramedullary irrigation, is necessary to prevent the need for subsequent reoperation. Close monitoring of patients is critical to prevent complications and reduces long-term sequelae. Patients who fail to respond to antibiotics should undergo prompt surgical interventions. Repeat imaging should also be considered in patients who are not responding to treatment in order to determine persistent infection and assess the extent of bony and soft tissue involvement [6,10,11,14,16].

In summary, MRSA infections of the musculoskeletal system in children may have serious complications. They require early administration of antibiotics and may necessitate multiple surgical interventions. These patients often have a protracted hospital course and require vigilant monitoring to minimize the risk of complications.

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QUESTION 7: What is the best management for mycobacterium tuberculosis (TB) of the musculoskeletal system in children?

RECOMMENDATION: Mycobacterium TB periprosthetic joint infection (PJI) must be treated in collaboration with an infectious disease specialist, noting that the duration of treatment (minimum six months and up to two years) and the type of antimicrobials (usually a combination of four drugs) is determined based on the resistance profile of the pathogen.

LEVEL OF EVIDENCE: Moderate

DELEGATE VOTE: Agree: 86%, Disagree: 2%, Abstain: 12% (Super Majority, Strong Consensus)

RATIONALE

There is an agreement that anti-TB medications can eradicate most of the bacilli and prevent both relapse and drug resistance. The current recommendation for treatment length of extra-pulmonary TB in children is six months. However, these recommendations do not apply to osteoarticular infections and meningitis. Almost all available guidelines strongly recommend 12 months of anti-TB treatment for osteoarticular TB [1–5].

The recommended regimen for children with suspected or confirmed osteoarticular TB is a four-drug regimen consisting of Isoniazid (INH), Rifampin (RIF), Pyrazinamide (PZA) and Ethambutol (EMB) for 2 months, followed by a two-drug regimen of Isoniazid and Rifampin (HR) for 10 months [6].

There is limited literature that describes how to treat children with drug-resistant TB. For mono-drug resistance to either Isoniazid or Rifampicin, the recommendation is for 6-9 months of a three-drug regimen consisting of the other susceptible antibiotics from

TABLE 1. Recommendations for treatment of resistant TB in pediatrics

	Initial Phase	Maintenance Phase
INH-monoresistance TB	RIF + PZA + EMB (2 months)	RIF + PZA + EMB (4-7 months)
RIF-monoresistance TB	INH+ PZA + EMB + FQN (2 months)	INH + EMB + FQN (10-16 months)

INH, Isoniazid; EMB, Ethambutol; RIF, Rifampicin; PZA, Pyrazinamide; FQN, Fluoroquinolones; TB, Tuberculosis

the conventional four-drug regimen (Table 1) [3,7,8]. For multi-drug resistant (MDR) TB, all guidelines recommend a longer treatment period of up to 24 months with all four anti-TB drugs [3,7,9]. Evaluation of the organism's drug susceptibility profile should also be conducted [3,7,9].

While some authors have reported favorable results with chemotherapy and non-operative splinting of the affected joint(s), others have recommended debridement of focal bony involvement and arthroscopic or open synovectomy to decrease the overall bioburden of infected material [10,11].

Arthrodesis, especially of the hip joint, may be an option in the event of severe destruction of the joint secondary to infection [12]. Orthopaedic interventions in spinal TB may occasionally be recommended to prevent deformity of the spine in pediatric patients. These procedures may include surgical intervention, application of a brace or cast in addition to standard chemotherapy. Proper immobilization of the growing spine in pediatric patients may help achieve a solid fusion without surgical procedures.

Surgical intervention is reserved for patients with formation of a large anterior column abscess, severe kyphotic deformity or progressive spinal deformity despite chemotherapy [13,14].

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QUESTION 8: What is the role of host gene expression and severity of acute osteoarticular infection in children, especially methicillin-resistant *Staphylococcus aureus* (*S. aureus*), or MRSA, infection?

RECOMMENDATION: Unknown. The limited literature available suggests altered host gene transcription related to the balance of the body's adaptive and innate immune responses may increase pediatric patients' susceptibility to severe osteoarticular infection, particularly in cases of MRSA. However, much more investigation is needed to determine which genes are most useful and how they can be utilized to help physicians anticipate the course of infection in a given patient.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 75%, Disagree: 3%, Abstain: 22% (Super Majority, Strong Consensus)