Pediatric Sonography Findings as a Guidance Modality in Musculoskeletal Infections

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Received: May 03, 2021; Accepted: June 29, 2021; Published: July 08, 2021

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Abstract

Ultrasound is a very useful non-invasive medical image method for the diagnosis of musculoskeletal lesions in children. It is an important tool for helping radiological exams. The value of ultrasound in early diagnosis of musculoskeletal diseases in children was evaluated. The image technique delivers high sensitivity and good specificity for the musculoskeletal system in pediatric patients. The method can be helped on the basis of clinical history, physical examinations, radiograph images, and laboratory tests to have the diagnosis defined. Thus, it will be easier to decide the most appropriate management of treatment for patients. The objective of diagnosis and treatment is to improve the patient’s ability to function, one of the goals of most interventions. Ultrasound is a useful and valid instrument in orthopedic research for helping early diagnosis of musculoskeletal lesions in children.

Purpose: The purpose of this paper was investigating ultrasound images as a diagnostic method to demonstrate the value of this procedure for sensitivity and specificity in musculoskeletal pathologies of muscle, bone, joint, and the hypodermis tissues.

Keywords: Orthopedics; Ultrasound; Pediatrics; Musculoskeletal system; Infection; Image method

Introduction

Ultrasonography is a non-invasive, low cost imaging, and safe method which does not emit ionizing radiation. It displays several diagnostic benefits such as high resolution and real-time evaluation capability [1]. In clinical practice, ultrasonography has a high application potential for the diagnosis of articular alterations and just-articular fluids [2]. Ultrasound provides morphological characteristics and anatomical relationships of infectious lesions, as well as distinguishes fluid collections from solid masses; this imaging modality for diagnosing musculoskeletal infections in pediatric patients can be used [3].

Musculoskeletal infection represents a common clinical problem in pediatric practice. Ultrasound is a valuable tool for diagnosis of musculoskeletal lesions, especially in children. For these patients, ultrasound is particularly suitable because usually there is an increased proportion presence of cartilage in comparison to bone. Furthermore, sedation of patients is not required and examination can be done on the patient’s bed. This imaging technique also allows bilateral comparative and contralateral images at different planes and compression effect on the lesions to be examined. Thus, ultrasonography as a good diagnostic imaging mode for musculoskeletal lesions can be considered [4]. This has been used by other investigation of morphology, density, and contours of anatomical areas, providing observation irregularities in musculoskeletal system [5]. With the increased interest and use of ultrasound, the question arises whether it can support conventional radiology for promoting early diagnosis of musculoskeletal diseases.

Materials and Methods

Epidemiological comments

As usual, through the Brazil Platform institutional review board, analyzed, validated, and approved a Research Project of a study entitled Pediatric Sonography Findings as a Guidance Modality in Musculoskeletal Infections. The study was registered with PCEA (Presentation Certificate of Ethical Appreciation) number 52821215.3.0000.5275 on December 14, 2015. The typology (a type of study) of the design employed in this sample of the case was a cohort study (single cohort), with individualizing, observational, longitudinal, and retrospective characteristics.

The data was treated descriptively, using percentages and simple frequencies presented in form of tables. A total of 92 pediatric patients who underwent ultrasonography in the recent years at the Orthopedic/Radiological Department, Jesus Children’s Hospital, Rio de Janeiro, Brazil were studied. Patients with infection/inflammation of the musculoskeletal system were managed. Radiographs and ultrasonography (types of imaging) remain a gold standard used as validated instruments (important tools) to improve medical care in daily clinical practice.

The children diagnosed with musculoskeletal infection had a methodological routine to follow to determine whether
patients would have involvement of muscle, bone, joint, and the hypodermis.

A registry of patient evaluation to gather detailed anamnesis, physical examination, and laboratory complementary exams were made. To elucidate the diagnosis, some surgical procedures such as arthrocentesis, muscle puncture drainage, and bone biopsies were done to establish the final diagnosis.

Sonographic imaging: was performed immediately after radiological exams of the musculoskeletal system in all 92 patients. A two-plane scan of the affected region (longitudinal and transverse), as well as a comparative study was done. We verified four patients (cases 08, 09, 38, and 70) in which, beyond the initial focus of the disease, we found infection in other regions, making a total of 96 infected tissues in 92 patients studied.

**Results**

**Analysis by gender**

The total number of patients in the study totaled 33 girls (36%) and 59 boys (64%). Muscle tissue comprised 28 boys (61%) and 18 girls (39%). Bone tissue entailed 17 boys (74%) and 6 girls (26%). With joints, there were 7 boys (54%) and 6 girls (46%). As to hypodermis tissue, 7 boys (70%) and 3 girls (30%).

**Analysis by race**

Regarding race, there were 51 white (55.4%) and 41 non-white children (44.6%). The muscle tissue report showed a higher incidence of white patients, corresponding to 22 cases (48%), followed by 24 non-white (52%). Concerning bone tissue, 15 white patients (65.2%) and 8 non-white (34.8%) were found. In joint evaluation, 9 patients were white (69.2%), and 4 non-white (30.8%). Regarding hypodermis, 5 patients were white (50%) and the other 5 (50%) non-white.

The highest prevalence of affected tissues entailed a greater predominance of muscular tissue (46 cases), bone tissue (23 cases), joint (13 cases), and the hypodermis (10 cases).

The sensitivity for liquid collection in muscle was absolute. Specificity, the percentage could not be calculated due to ultrasound does not distinguish material (plus or blood) investigated.

Sensitivity for contiguous collection of bone could be considered compatible, but not pathognomonic with a bone infection. Specificity, bone ultrasound does not show penetrability. Radiological exams are one the most important methods of image for helping bone diagnosis.

Our sample sensitivity for intraarticular fluid was defined. Specificity could not be analyzed due to the impossibility of discriminating pus, blood, or synovial liquid in the joint searched.

Hypodermis sonography sensitivity was elated. Specificity could not be calculated because hypodermis can be thickened in some cases as a secondary stimulus of the infected muscle.

**Discussion**

The following epidemiological data was verified upon literature analysis, [6-15] regarding the use of ultrasound for investigating musculoskeletal pathologies in the pediatric population. Regarding the patient’s age, of infectious muscle disease, the predominance was 4-7 years, at an average of 6.6 years. In our work, age group predominance was found, corresponding to newborns 3 years, followed by group 3-6 years, and 9-12 years respectively. Chacha in his work, reveals that age group from birth to 9 years muscle infection tissue injuries occurred in 80% of cases [7]. In our sample similar results, musculoskeletal injuries 77.5% were found.

The occurrence of muscle tissue infection in tropical countries has been reported by several authors [6,9-11,16-18] as an etiological hypothesis, favoring striated muscle fiber myositis. In our study incidence in the summer months was 40%.

Literature [19-26] epidemiological data of bone tissue infection in the pediatric population mentions an age variation of disease onset in group 4-12 years, comprising an average of 8 years. In our population, we observed that the greatest involvement of patients with bone tissue infection was by age group was 9-12 years, followed by the 6-9 years group. Therefore, our average sample was 6-12 years.

Regarding epidemiological data of infected lesions affecting synovial joints in the pediatric population, authors [27-35] ascertained a variation of signs and symptoms at age (2.5-13 years), corresponding to an average 6.2 years. In our sample, however, the greatest involvement of synovial joint infections occurred at age 6-12.

We did not find age data in epidemiological studies, using ultrasonography as an imaging method for skin infection (hypodermis). In our community, we found predominance of patients aged 3-6 years.

Relating to gender, predominance of males is observed by vast majority of authors [6-9,12,15,18,36-40] in muscle tissue infection, the variation was in proportion. (2 to 4:1). In this study, a proportion (1.5:1) was found.

Relating to bone tissue, authors [21-23,25,26] noted male predominance (2:1). Mah [23] ascertain predominance (13:1) in his series female. In our study, we obtained a proportion of (3:1) males.

With reference to joint involvement, some authors report predominance of males over females (3:2:1) [27-33,40]. Wing strand [33] was the only one who observed the opposite circumstance, of females over males. In this study, a prevalence of males over females to a proportion of (1:2:1) was found.

Concerning hypodermis, we did not find studies in the literature about the description of sex in epidemiological data. In our group, 7 cases were found; the proportion was (2:3:1) boys over girls.

The presence of malnutrition status has been ascertained in

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**Citation:** Pinheiro Pedro Carlos, Freitas Lea, Maymone Waldir, Hemais Paulo Miguel, Correa Marilia Grizende et al. (2021) Pediatric Sonography Findings as a Guidance Modality in Musculoskeletal Infections. J Exerc Sports Orthop 7(1): 1-23. DOI: http://dx.doi.org/10.15226/2374-6904/7/1/00182
patients with muscle tissue infection, this aspect being reported by several authors [6,7,16-8]. In this analysis, pediatric patients with musculoskeletal infection majority malnutrition was a constant (Table 1).

Malhotra, et al. [12] found that ultrasonography is the best method of investigation to diagnose iliopsoas muscle infection. When enlarged, muscle infection must be suspected for morphological disturbance and hypoechoic areas. In this population, with tropical iliopsoas muscle pyomyositis, ultrasound sensitivity was found in all cases. The muscle involvement sites are the most commonly affected skeleton muscles located in lower limbs and the same compartment, with thigh muscles being most affected41. In our population, quadriceps thigh muscle was most observed as stated by (Table 2).

Regarding muscle infection, Staphylococcus aureus is most commonly pathogenic organism found [6,7,10,11,16-18]. In this study, a high prevalence of this germ was also detected.

Bone ultrasound does not show penetrability; however, the effects of bone lesions adjacent to soft tissues can be analyzed [22]. The bone cannot be completely visualized due to almost complete attenuation or reflection of sound on its interface [42]. Ultrasound relationship of fluid collection with bone is a factor which differentiates bone infection from soft tissue infection [43]. Bone infection tissue is considered a metastatic lesion, neither accompanying nor suffering secondary contamination by muscular abscess [43]. In our patients, no case of bone infection as a consequence of muscle infection was detected.

Ultrasonography allows fluid collection to be located relative to the bone. When it is in direct contact with it, diagnosis bone tissue infection should be suspected. Hypoechoic fluid collection adjacent to the bone is considered highly suggestive of bone infection. Fluid collection away from bone interpretation is a soft tissue abscess. Fluid collection next to bone suggests that it originates from the latter, indicating a hematogenous bone infection. Such an infection produces changes in soft tissues adjacent to the bone; ultrasound in the first 24 hours of symptomatology can be observed [3,4,44]. In our specimen bone tissue infection, presence of anechoic or hypoechoic fluid collection adjacent to bone, should be suspected according to (Table 3).

Ultrasound allows characterizing periarticular and intraarticular abnormalities [2,45,46]. Zawin, et al. [35] in the hip joint reveals that a negative ultrasound excludes septic arthritis, but does not rule out the possibility of osteomyelitis. We had confirmation of the author's statement in our population. Ultrasonography, on the other hand, demonstrates the involvement of joint distention without determining the characteristic of joint fluid collection [19,27,47,48]. Authors affirm having few definitions of sonography between septic / aseptic as well as traumatic/sterile synovial effusions [30,31,49]. In this search we have found the same doubt about intra-articular fluid, as stated by (Table 4).

Subcutaneous abscess is associated with hypodermitis41.

Table 1: Analysis by musculoskeletal system.

<table>
<thead>
<tr>
<th>Affected Tissue</th>
<th>Number of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle</td>
<td>49</td>
<td>51</td>
</tr>
<tr>
<td>Bone</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Joint</td>
<td>13</td>
<td>13.5</td>
</tr>
<tr>
<td>Hypodermis</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Analysis by muscle infected.

<table>
<thead>
<tr>
<th>Muscle Tissue</th>
<th>Right Side</th>
<th>Left Side</th>
<th>Number of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps femoris</td>
<td>14</td>
<td>5</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td>Iliopsoas</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Hamstring</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Infraspinatus</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Gluteus maximus</td>
<td>4</td>
<td>--</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Deltoid</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Triceps brachii</td>
<td>2</td>
<td>--</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Gastrocnemius</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Latissimus dorsi</td>
<td>--</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Brachialis</td>
<td>1</td>
<td>--</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Adductor</td>
<td>--</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>17</td>
<td>49</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3: Analysis by bone infected.

<table>
<thead>
<tr>
<th>Bone Tissue</th>
<th>Right Side</th>
<th>Left Side</th>
<th>Number of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femur</td>
<td>7</td>
<td>1</td>
<td>8</td>
<td>33.4</td>
</tr>
<tr>
<td>Tibia</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>Cervical vertebrae</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Thoracic vertebrae</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Ilium</td>
<td>2</td>
<td>--</td>
<td>2</td>
<td>8.3</td>
</tr>
<tr>
<td>Ribs</td>
<td>2</td>
<td>--</td>
<td>2</td>
<td>8.3</td>
</tr>
<tr>
<td>Patella</td>
<td>1</td>
<td>--</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Metacarpal</td>
<td>1</td>
<td>--</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Clavicle</td>
<td>1</td>
<td>--</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>4</td>
<td>24</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4: Analysis by sinovial joints contaminated.

<table>
<thead>
<tr>
<th>Joint</th>
<th>Number of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee</td>
<td>8</td>
<td>61.5</td>
</tr>
<tr>
<td>Hip</td>
<td>5</td>
<td>38.5</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 5: Analysis of the hypoderm.

<table>
<thead>
<tr>
<th>Subcutaneous Regions</th>
<th>Number of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thigh</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Hand</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Leg</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Foot</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Hip</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6: Analysis by final diagnosis of musculoskeletal tissues.

<table>
<thead>
<tr>
<th>Final Diagnosis</th>
<th>Number of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tropical pyomyositis</td>
<td>49</td>
<td>51</td>
</tr>
<tr>
<td>Osteomyelitis</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Septic arthritis</td>
<td>13</td>
<td>13.5</td>
</tr>
<tr>
<td>Hypodermitis</td>
<td>10</td>
<td>10.4</td>
</tr>
<tr>
<td>Spine osteomyelitis Tuberculosis</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Lymph Nodes tuberculosis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>100</td>
</tr>
</tbody>
</table>

Hypodermis infection is a poorly defined process, appearing diffusely swollen, with exudative dissection of tissue spaces [41,50,51]. Ultrasound interpretation of hypodermis infection is based on its thickening, which makes hyperechogenic. In all of our patients, ultrasound allowed us to define the location of the lesion due to the presence of scattered echoes which produced increased echogenicity. The sensitivity in our project was very high concerning (Table 5).

Case: 01
Age at Diagnosis 9.9 (Yrs. + Mos.).
Infected tissue: right thigh muscles.
Roentgen images: increased density in the soft tissue of the right thigh muscles Figure: 1.
Ultrasound images: well-defined hypoechogenic fluid collection with debris inside in anterolateral group of the right thigh muscle Figure: 2.
Diagnosis: Tropical Pyomyositis of the right thigh quadriceps muscle.

Case: 02
Age at Diagnosis 9.11 (Yrs. + Mos.).
Infected tissue: the right leg bone.
Roentgen images: permeative lytic lesions in the medullary region of the right tibia in the lower third with an adjacent periosteum reaction Figure: 3.
Ultrasound images: elongated hypoechoic fluid collection adjacent to the right tibia with periosteum elevation + thickened hypodermis Figure: 4.
Diagnosis: Osteomyelitis of the right tibia.

Case: 03
Age at Diagnosis 6.9 (Yrs. + Mos.).
Infected tissue: synovial membrane.
Roentgen images: increased left knee soft tissue density with anterior displacement of the left patella + erasure of the suprapatellar fat line Figure: 5.
Ultrasound images: intra-articular anechoic fluid collection, causing distension of the left knee suprapatellar bursa Figure: 6.
Diagnosis: Septic arthritis of the left knee.
Case: 04
Age at Diagnosis: 9.9 (Yrs. + Mos.).
Infected tissue: left thigh muscles
Roentgen images: increased soft tissue density of the left thigh (chronic process) Figure: 8.
Ultrasound images: deep hypoechoic fluid collection at the level of the left thigh anterior muscles Figure: 9.
Diagnosis: Tropical Pyomyositis of the left thigh quadriceps muscle.

Case: 05
Age at Diagnosis: 5 (Yrs.).
Infected tissue: right bone (4th metacarpal) Figure: 10.
Roentgen images: structural alteration of the 4th metacarpal with an insufflating fusiform aspect + increased right-hand soft tissue density Figure: 11.
Ultrasound images: a fluid hypoechoic collection with clear contour located adjacent to the bone with periosteum elevation Figure: 12.
Diagnosis: Osteomyelitis of the right fourth metacarpal.

Case: 06
Age at Diagnosis: 8 (Yrs.).
Infected tissue: right thigh muscles Figure: 13.
Roentgen images: increased right thigh soft tissue density Figure: 14.
Ultrasound images: a diffuse hypoechoic fluid collection with debris inside the right thigh muscle + increased echogenicity and hypodermis thickness Figure: 15.
Diagnosis: Tropical Pyomyositis of the right thigh quadriceps muscle.

Case: 07
Age at Diagnosis: 4.10 (Yrs. + Mos.).
Infected tissue: left thigh muscles.
Roentgen images: increased soft tissue density in the posterior region of the left thigh Figure: 16.
Ultrasound images: diffuse hypoechoic fluid collection in the posteromedial region of the left thigh muscle Figure: 17.
Diagnosis: Tropical Pyomyositis of the left hamstring muscles.

Case: 08
Age at Diagnosis: 2 (Yrs.).
Infected tissue: right thigh + shoulder muscles.
Roentgen images: increased soft tissue density of the right thigh and shoulder Figure: 18.
Ultrasound images: well defined hypoechoic fluid collection in anterolateral right thigh musculature + well defined hypoechoic fluid collection of the right shoulder region muscle Figure: 19.
Diagnosis: Tropical Pyomyositis of the right thigh quadriceps and right infraspinatus muscle.

Case: 09
Age at Diagnosis: 5.1 (Yrs. + Mos.).
Infected tissue: left hip gluteal muscles.
Roentgen images: increased soft tissue density of the right gluteal muscles region + left thigh muscles Figure: 20.
Ultrasound images: a hypoechoic fluid collection of the left gluteal region in the muscle plane of the right hip + hypoechoic fluid collection in a deep plane of the left anterior left thigh region muscles Figure: 21.
Diagnosis: Tropical Pyomyositis of the right gluteus maximus + left thigh quadriceps muscle.
Case: 10
Age at Diagnosis: 1.4 (Yr. + Mos.).
Infected tissue: bone thoracic spine.
Roentgen images: the destruction of vertebral bodies T10, T11 and T12 + accentuation of thoracic kyphosis Figure: 22.
Ultrasound images: ossifluent abscess with disorganization of the morphology (hyperechogenic image) of the vertebral bodies Figure: 23.
Diagnosis: Spine Osteomyelitis Tuberculosis (T10-T12).

Case: 11
Age at Diagnosis: 3.4 (Yrs. + Mos.).
Infected tissue: left leg hypodermis.
Roentgen images: increased soft tissue density of the left leg proximal region Figure: 24.
Ultrasound images: the diffuse increase in thickness and echogenicity of the left leg hypodermis Figure: 25, Figure: 26.
Diagnosis: Hypodermitis of the left leg.

Case: 12
Age at Diagnosis: 9.2 (Yrs. + Mos.).
Infected tissue: the left thigh bone.
Roentgen images: alteration of the left femur morphology + osteopenia due to an established chronic process osteomyelitic Figure: 27.
Ultrasound images: irregular hyperechogenic cortical line with hypoechogenic fluid collection adjacent to the bone and fistular course to the hypodermis Figure: 28.
Diagnosis: Osteomyelitis of the left femur.

Case: 13
Age at Diagnosis: 2 (Yrs.).
Infected tissue: spinal bone.
Roentgen images: the destruction of cervical vertebral bodies C3, C4 and part of C5 + ossifluent abscess displacing the structures of the anterior neck region Figure: 29.
Ultrasound images: ossifluent abscess, compressing the carotid artery and disorganization of the hyperechogenic morphology of the vertebral bodies Figure: 30.
Diagnosis: Tuberculous spondylitis (C3, C4, and C5).

Case: 14
Age at Diagnosis: 2 (Yrs.).
Infected tissue: right thigh muscles.
Roentgen images: increased right thigh soft tissue density Figure: 31.
Ultrasound images: intramuscular hypoechogenic fluid collection, causing disorganization of a homogeneous aspect of the quadriceps muscle Figure: 32 / Figure: 33.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle.

Case: 15
Age at Diagnosis: 5 (Mos.).
Infected tissue: synovial membrane.
Roentgen images: increased right hip soft tissue density Figure: 34.
Ultrasound images: hypoechogenic right hip fluid intra-articular collection Figure: 35.
Diagnosis: Septic arthritis of the right hip.
Case: 16
Age at Diagnosis 7.5 (Yrs. + Mos.).
Infected tissue: right hip bone.
Roentgen images: permeative lesions of the right iliac bone with the irregular acetabulum Figure: 36.
Ultrasound images: irregularity of the bone surface + edema of the right iliacus muscle, causing a hypoechoic halo adjacent to the bone Figure: 37.
Diagnosis: Osteomyelitis of the right iliac bone.

Case: 17
Age at Diagnosis 3.1 (Yrs. + Mos.).
Infected tissue: hand hypodermis Figure: 38.
Roentgen images: increased soft tissue density on the dorsum of the left hand Figure: 39.
Ultrasound images: thickening and increased echogenicity on the dorsum of the left-hand hypodermis Figure: 40.
Diagnosis: Hypodermitis of the left hand.

Case: 18
Age at Diagnosis 3.10 (Yrs. + Mos.).
Infected tissue: left foot hypodermis.
Roentgen images: increased soft tissue density on the dorsum of the left foot Figure: 41.
Ultrasound images: hyperechoic area with thickening on the dorsum of the left foot hypodermis Figure: 42.
Diagnosis: Hypodermitis of the left foot.

Case: 19
Age at Diagnosis 2.9 (Yrs. + Mos.).
Infected tissue: right arm muscles.
Roentgen images: increased right arm soft tissue density Figure: 43.
Ultrasound images: large well-defined hypoechoic fluid collection on the level of the muscular plan of the posterior region of the right arm Figure: 44.
Diagnosis: Tropical Pyomyositis of the right triceps brachii muscle.

Case: 20
Age at Diagnosis 7 (Yrs.).
Infected tissue: right leg bone.
Roentgen images: increased density of soft tissue in the perimaleolar region + irregularity of the external cortex with the permeative image on a metaphyseal region of the right tibia Figure: 45.
Ultrasound images: hypoechoic fluid collection adjacent to the right tibia with periosteum elevation in the distal bone metaphysis and thickening of the right leg adjacent hypodermis Figure: 46.
Diagnosis: Osteomyelitis of the right tibia.
Case: 21
Age at Diagnosis 5.9 (Yrs. + Mos.).
Infected tissue: right foot hypodermis.
Roentgen images: increased soft tissue density on the dorsum of the right foot Figure: 47.
Ultrasound images: increased thickness and echogenicity of the hypodermis on the dorsum of the right foot over metatarsus Figure: 48, Figure: 49.
Diagnosis: Hypodermitis of the right foot.

Case: 22
Age at Diagnosis 7.10 (Yrs. + Mos.).
Infected tissue: right knee synovial membrane.
Roentgen images: increased soft tissue density of the right knee, blurring the suprapatellar fat line without joint destruction Figure: 50.
Ultrasound images: a large amount of anechoic image intra-articular with fluid collection, distending the right knee suprapatellar joint Figure: 51.
Diagnosis: Synovitis of the right knee joint.

Case: 23
Age at Diagnosis 10 (Mos.).
Infected tissue: right arm muscles.
Roentgen images: increased right soft tissue arm density Figure: 52.
Ultrasound images: multiseptate hypoechogetic fluid collection with debris inside in the right arm muscular plane Figure: 53.
Diagnosis: Tropical Pyomyositis of the right triceps brachii muscle.

Case: 24
Age at Diagnosis 12 (Yrs.).
Infected tissue: right arm muscles.
Roentgen images: increased soft tissue density of the right arm Figure: 54.
Ultrasound images: rounded hypoechogetic fluid collection of the right arm muscles Figure: 55.
Diagnosis: Tropical Pyomyositis of the right brachialis muscle.
Case: 25
Age at Diagnosis 1.7 (Yr. + Mos.).
Infected tissue: right thigh muscle.
Roentgen images: increased soft tissue density of the right thigh, erasing the suprapatellar fat Figure: 56.
Ultrasound images: increased thickness on level of the muscular plane, which is altered in texture and echogenicity with a hypoechoicogenic area in the anterior region of the right thigh muscles Figure: 57.
Diagnosis: Tropical Pyomyositis of the right thigh quadriceps muscle.

Case: 26
Age at Diagnosis 5.4 (Yrs. + Mos.).
Infected tissue: right leg bone.
Roentgen images: increased soft tissue density of the right leg Figure: 58.
Ultrasound images: multiseptate collection adjacent to the cortical tibial bone with periosteum elevation Figure: 59.
Diagnosis: Osteomyelitis of the right tibia.

Case: 27
Age at Diagnosis 6.1 (Yrs. + Mos.).
Infected tissue: right shoulder muscles Figure: 60.
Roentgen images: increased soft tissue density of the right shoulder muscles Figure: 61.
Ultrasound images: a massive hypoechoicogenic fluid collection with amorphous echoes inside and thick muscular wall located in a plane over the right scapular region Figure: 62.
Diagnosis: Tropical Pyomyositis of the right infraspinatus muscle.

Case: 28
Age at Diagnosis 4.6 (Yrs. + Mos.).
Infected tissue: left leg bone Figure: 63.
Roentgen images: left leg increased soft tissue density Figure: 64.
Ultrasound images: multiple fluid coalescent collections, causing hypoechoicogenic images with periosteum elevation adjacent to the left tibia bone Figure: 65.
Diagnosis: Osteomyelitis of the left tibia.

Case: 29
Age at Diagnosis 3.3 (Yrs. + Mos.).
Infected tissue: hypodermis of the left inguinal region Figure: 66.
Roentgen images: normal hip image Figure: 67.
Ultrasound images: hypoechogenic fluid collections with a multiloculated aspect with debris in the interior on level of the left hip joint Figure: 68.
Diagnosis: Lymphnodal tuberculosis (periferic ganglionic tuberculosis).

Case: 30
Age at Diagnosis 6.10 (Yrs. + Mos.).
Infected tissue: right thigh bone.
Roentgen images: diffuse periosteum thickening conglobating bone sequestrum, causing an aspect of involucrum on the lower third of the right femur Figure: 69.
Ultrasound images: the rupture of the cortical bone with collection adjacent to the right femur, observing a fistulous course and bone sequestrum Figure: 70.
Diagnosis: Osteomyelitis of the right femur.
Case: 31
Age at Diagnosis 4 (Mos.).
**Infected tissue:** right leg hypodermis Figure: 71.
Roentgen images: increased tissue density of the right leg with preservation of the bone structure Figure: 72.
**Ultrasound images:** diffuse increase in thickness and echogenicity at the hypodermis of the right leg Figure: 73.
**Diagnosis:** Hypodermitis of the right leg.

Case: 32
Age at Diagnosis 3.3 (Yrs. + Mos.).
**Infected tissue:** right shoulder muscle.
Roentgen images: increased soft tissue density of the right shoulder muscle Figure: 74.
**Ultrasound images:** fluid hypoechoic collections with a multiloculated aspect at the muscle level of the right shoulder region Figure: 75.
**Diagnosis:** Tropical Pyomyositis of the right deltid muscle.

Case: 33
Age at Diagnosis 11.4 (Yrs. + Mos.).
**Infected tissue:** right thigh muscle.
Roentgen images: increased soft tissue density at the lower third of the right thigh Figure: 76.
**Ultrasound images:** hypoechoic fluid collection located in the anterior region of the right thigh muscle Figure: 77.
**Diagnosis:** Tropical Pyomyositis of the right thigh quadriceps muscle.

Case: 34
Age at Diagnosis 4.2 (Yrs. + Mos.).
**Infected tissue:** left leg muscle.
Roentgen images: increased tissue density on the posterior region of the left leg Figure: 78.
**Ultrasound images:** large hypoechoic collection at the level of the muscular plane, with inside debris in the posterior region of the left leg Figure: 79.
**Diagnosis:** Tropical Pyomyositis of the left leg gastrocnemius muscle.

Case: 35
Age at Diagnosis 1.4 (Yr. + Mos.).
**Infected tissue:** left thigh muscle.
Roentgen images: increased tissue density of the left thigh Figure: 80.
**Ultrasound images:** fluid hypoechogenic collection at the level of the posterior region of the left thigh muscles Figure: 81.
**Diagnosis:** Tropical Pyomyositis of the left hamstring muscles.

Case: 36
Age at Diagnosis 1.7 (Yr. + Mos.).
**Infected tissue:** synovial membrane of the left knee joint.
Roentgen images: increased soft tissue density of the left knee, with missing of the suprapatellar fat line Figure: 82.
**Ultrasound images:** anechoic intra-articular fluid collection, causing dissection of the left knee suprapatellar bursa Figure: 83.
**Diagnosis:** Synovitis of the left knee joint.
Case: 37
Age at Diagnosis 4.9 (Yrs. + Mos.).
Infected tissue: abdomen muscle Figure: 84.
Roentgen images: silhouette deletion of the left iliopsoas muscle + hip flexion contracture + thickening (edema) of the internal left obturator muscle Figure: 85.
Ultrasound images: hypoechogenic fluid collection, with the debris of the left iliopsoas muscle Figure: 86.
Diagnosis: Tropical Pyomyositis of the left iliopsoas muscle.

Case: 38
Age at Diagnosis 2.4 (Yrs. + Mos.).
Infected tissue: left thigh muscle + right chest bone.
Roentgen images: increased density of the soft tissue of the left thigh + lower region of the right thorax.
Ultrasound images: well-defined hypoechogenic fluid collection at the level of the left thigh muscle plane + hypoechogenic fluid collection adjacent to the tenth right rib Figure: 87, Figure: 88.
Diagnosis: Tropical Pyomyositis of the left quadriceps muscle + osteomyelitis of the tenth right rib.

Case: 39
Age at Diagnosis 5.6 (Yrs. + Mos.).
Infected tissue: left shoulder muscle Figure: 89.
Roentgen images: increased soft tissue density of the shoulder at the level of the left scapular region Figure: 90.
Ultrasound images: hypoechogenic fluid collection at the level of muscular plane of the left scapular region Figure: 91.
Diagnosis: Tropical Pyomyositis of the left infraspinatus muscle.

Case: 40
Age at Diagnosis 40 (Days).
Infected tissue: right thigh muscle Figure: 92.
Roentgen images: marked increase in soft tissue density in the anterior region of the right thigh, with preservation of the bone structure Figure: 93.
Ultrasound images: massive hypoechogenic fluid collection with debris inside, + alteration and irregularity of the muscle texture at the anterior region of the right thigh Figure: 94.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle.
Case: 41
Age at Diagnosis: 2.5 (Yrs. + Mos.).
Infected tissue: right knee hypodermis Figure: 95.
Roentgen images: increased soft tissue density of the right thigh adjacent to the knee Figure: 96.
Ultrasound images: increased thickness and echogenicity at the hypoderm of the right thigh Figure: 97.
Diagnosis: Hypodermitis of the right thigh.

Case: 42
Age at Diagnosis: 2.7 (Yrs. + Mos.).
Infected tissue: left thigh muscle.
Roentgen images: increased soft tissue density of the left thigh Figure: 98.
Ultrasound images: hypoechoic fluid collection at the muscular plane of the left thigh anterior region Figure: 99.
Diagnosis: Tropical Pyomyositis of the left thigh quadriceps muscle.

Case: 43
Age at Diagnosis: 1.2 (Yrs. + Mos.)
Infected tissue: hypoderm of the right thigh.
Roentgen images: increased soft tissue density of the left thigh Figure: 100.
Ultrasound images: thickening and increased echogenicity of the hypodermis of the right thigh Figure: 101.
Diagnosis: Hypodermitis of the right thigh.

Case: 44
Age at Diagnosis: 15 (Days).
Infected tissue: right thigh bone.
Roentgen images: increased soft tissue density of the right knee with a lytic lesion of the right femur metaphysis, and periosteum reaction Figure: 102.
Ultrasound images: hypoechoic fluid collection adjacent to the right femur with periosteum reaction Figure: 103.
Diagnosis: Osteomyelitis of the right femur.

Case: 45
Age at Diagnosis: 11.2 (Yrs. + Mos.)
Infected tissue: right leg muscle.
Roentgen images: increased soft tissue density of the right leg muscle Figure: 104.
Ultrasound images: hypoechoic fluid collection at the muscular plane of the right leg Figure: 105.
Diagnosis: Tropical Pyomyositis of the right leg gastrocnemius muscle.
Case: 46
Age at Diagnosis: 9.9 (Yrs. + Mos.).
Infected tissue: abdomen muscle
Roentgen images: silhouette erasure of the left iliopsoas muscle
Ultrasound images: fluid collection hypoechogenic and hyperechogenic (heterogeneous) with debris inside of the left iliopsoas muscle
Diagnosis: Tropical Pyomyositis of the left iliopsoas muscle.

Case: 47
Age at Diagnosis: 3.11 (Yrs. + Mos.).
Infected tissue: left thigh muscle
Roentgen images: increased soft tissue density of the left thigh
Ultrasound images: hypoechogenic fluid collection inside the muscle at the anterior region of the left thigh
Diagnosis: Tropical Pyomyositis of the left thigh quadriceps muscle.

Case: 48
Age at Diagnosis: 6.5 (Yrs. + Mos.).
Infected tissue: right thigh hypodermis.
Roentgen images: increased soft tissue density of the right thigh
Ultrasound images: increased thickness and echogenicity of the right thigh hypodermis
Diagnosis: Hypodermitis of the right thigh.

Case: 49
Age at Diagnosis: 2.5 (Yrs. + Mos.).
Infected tissue: abdomen muscle
Roentgen images: silhouette erasing of the right iliopsoas muscle
Ultrasound images: disorganization in the texture + diffuse thickening of the right iliopsoas muscle
Diagnosis: Tropical Pyomyositis of the right iliopsoas muscle due to lymphoid hyperplasia.
Case: 50
Age at Diagnosis: 2 (Yrs.)
Infected tissue: right thigh muscle

**Roentgen images:** increased soft tissue density of the right thigh

**Ultrasound images:** fluid hypoechogenic collection inside the posterior muscular group of the right thigh

**Diagnosis:** Tropical Pyomyositis of the right hamstring muscle.

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Case: 51
Age at Diagnosis: 3.10 (Yrs. + Mos.)
Infected tissue: left thigh bone

**Roentgen images:** increase of left hip joint space + soft tissue density + left hip dislocation

**Ultrasound images:** hypoechogenic intra-articular fluid collection with echoes inside + irregularity and thickening of the articular capsule (ilio-femoral ligament) of the left hip

**Diagnosis:** Osteomyelitis of the left femoral neck.

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Case: 52
Age at Diagnosis: 8 (Yrs.)
Infected tissue: right shoulder bone

**Roentgen images:** permeative changes in the structure of the middle and distal third of the right clavicle, with local periosteum reaction

**Ultrasound images:** hypoechogenic fluid collection (hypoechogenic band) adjacent to the bone, with rupture of the right cortical clavicle bone

**Diagnosis:** Osteomyelitis of the right clavicle.

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Case: 53
Age at Diagnosis: 7.6 (Yrs. + Mos.)
Infected tissue: left thigh muscle

**Roentgen images:** increased soft tissue density in the upper third of the right thigh

**Ultrasound images:** hypoechogenic fluid intramuscular collection at the anterior region of the right thigh

**Diagnosis:** Tropical Pyomyositis of the right quadriceps muscle.

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Case: 54
Age at Diagnosis: 6.3 (Yrs. + Mos.)
Infected tissue: left axillary muscle

**Roentgen images:** increased soft tissue density in the left axillary region

**Ultrasound images:** lobulated hypoechogenic fluid collection at the level of the left axillary muscle plane

**Diagnosis:** Tropical Pyomyositis of the left latissimus dorsi muscle.
Case: 55
Age at Diagnosis 7.9 (Yrs. + Mos.).
Infected tissue: right shoulder muscle.
Roentgen images: increased soft tissue density of the right shoulder Figure: 127.
Ultrasound images: hypoechogenic elongated fluid collection of the right infraspinatus muscle Figure: 128.
Diagnosis: Tropical Pyomyositis of the right infraspinatus muscle.

Case: 56
Age at Diagnosis 7 (Yrs.).
Infected tissue: left hand hypodermis Figure: 129.
Roentgen images: increased soft tissue density on the dorsum of the left hand Figure: 130.
Ultrasound images: increased thickness and echogenicity at the hypodermis on the dorsum of the left hand Figure: 131.
Diagnosis: Hypodemitis of the left hand.

Case: 57
Age at Diagnosis 3.4 (Yrs. + Mos.).
Infected tissue: left thigh muscle.
Roentgen images: increased soft tissue density of the upper third of the left thigh Figure: 132.
Ultrasound images: hypoechogenic fluid intramuscular collection in the medial region of the left thigh Figure: 133.
Diagnosis: Tropical Pyomyositis of the adductor muscles of the left thigh.

Case: 58
Age at Diagnosis 7.6 (Yrs. + Mos.).
Infected tissue: synovial membrane of the right knee.
Roentgen images: increased soft tissue density of the upper third of the left thigh Figure: 134.
Ultrasound images: intra-articular anechoic fluid collection, causing distension at the suprapatellar bursa of the right knee Figure: 135.
Diagnosis: Synovitis of the right knee joint.

Case: 59
Age at Diagnosis 10 (Yrs.).
Infected tissue: left leg bone.
Roentgen images: multiple foci of bone erosion in the upper third of the left tibia with involucial aspect and bone sequestrum Figure: 136.
Ultrasound images: irregular cortical bone with adjacent hypoechogenic fluid collection + bone sequestrum Figure: 137.
Diagnosis: Osteomyelitis of the left tibia.

Case: 60
Age at Diagnosis 10 (Yrs.).
Infected tissue: right thigh bone.
Roentgen images: permeative lesion in the proximal metaphysis of the right femur and periosteum apposition Figure: 138.
Ultrasound images: hypoechogenic fluid collection adjacent to the right femoral neck with cortical irregularity Figure: 139.
Diagnosis: Osteomyelitis of the right femoral neck.
Case: 61
Age at Diagnosis 11.6 (Yrs. + Mos.).
Infected tissue: right shoulder muscle.
Roentgen images: increased soft tissue density of the right shoulder Figure: 140.
Ultrasound images: a heterogeneous collection of the right deltoid muscle Figure: 141.
Diagnosis: Tropical Pyomyositis of the right deltoid muscle.

Case: 62
Age at Diagnosis 10 (Yrs.).
Infected tissue: right thigh bone.
Roentgen images: permeative lesion on the proximal end with cortical irregularity and periosteum reaction of the right femur Figure: 142.
Ultrasound images: hypoechogenic fluid collection adjacent to the bone with irregularity and interruption of the hyperechogenic line of the cortical bone. It was also observed association with periosteum displacement, characterizing infectious process extension from bone to soft tissues Figure: 143.
Diagnosis: Osteomyelitis of the right femur.

Case: 63
Age at Diagnosis 9 (Yrs.).
Infected tissue: left leg bone.
Roentgen images: permeative lesions on the proximal end of the left tibia with bone sequestrum + alteration of bone structure and morphology with loss of substance Figure: 144.
Ultrasound images: hypoechogenic fluid collection adjacent to the bone with irregularity of the hyperechogenic cortical and bone sequestrum Figure: 145.
Diagnosis: Osteomyelitis of the left tibia.

Case: 64
Age at Diagnosis 10 (Yrs.).
Infected tissue: synovial membrane of the left knee joint.
Roentgen images: increased soft tissue density of the left knee joint Figure: 146.
Ultrasound images: anechoic intra-articular fluid collection with peripheral debris, distending the suprapatellar bursa of the left knee joint Figure: 147.
Diagnosis: Synovitis of the left knee joint. sis: Osteomyelitis of the left tibia.

Conclusion
Ultrasound comprises an excellent diagnostic imaging method for musculoskeletal diseases in children. It allows for characterizing and locating extra articular fluid as well as intra articular collections, complementing the low sensitivity and specificity of conventional radiographs, as well as distinguishing solid mass from fluid collection and establishing its location and determining relations with neighboring structures. Ultrasound has also been shown to be a high sensitivity and diagnostic specificity in musculoskeletal infections of pediatric patients, allowing us to safely and accurately differentiate superficial soft tissue from deep lesions. Moreover, with effectiveness, the decision of the most appropriate type of treatment is facilitated. Furthermore, a patient follow-up, as well as the evolution of infected tissues is recommended. In summary, we found that the investigation on sensitivity and specificity findings, regarding muscle, bone, joint, and hypodermis, the answer has been demonstrated in the chapter about result analysis by each tissue studied.
Case: 65
Age at Diagnosis: 6.2 (Yrs. + Mos.).
Infected tissue: right thigh muscle.
Roentgen images: increased soft tissue density of the right thigh Figure: 148.
Ultrasound images: hypoechoic fluid intramuscularly collection in the anterior region of the right thigh Figure: 149.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle.

Case: 66
Age at Diagnosis: 1.1 (Yr. + Mos.).
Infected tissue: synovial membrane of the left hip joint.
Roentgen images: enlargement of the joint space with capsule distention of the left hip joint Figure: 150.
Ultrasound images: hypoechoic fluid intra-articular collection with debris inside, producing distension of the joint capsule (iliofemoral ligament) of the left hip joint Figure: 151.
Diagnosis: Septic arthritis of the left hip joint.

Case: 67
Age at Diagnosis: 1.1 (Yr. + Mos.).
Infected tissue: synovial membrane of the left hip joint.
Roentgen images: enlargement of the joint space with capsule distention of the left hip joint Figure: 150.
Ultrasound images: hypoechoic fluid intra-articular collection with debris inside, producing distension of the joint capsule (iliofemoral ligament) of the left hip joint Figure: 151.
Diagnosis: Septic arthritis of the left hip joint.

Case: 68
Age at Diagnosis: 8 (Mos.).
Infected tissue: synovial membrane of the right knee joint Figure: 154.
Roentgen images: increased soft tissue density of the right knee joint Figure: 155.
Ultrasound images: hypoechoic fluid intra-articular collection, inducing enlargement of the joint space and distension of the suprapatellar bursa of the right knee joint Figure: 156.
Diagnosis: Septic arthritis of the right knee joint.

Case: 69
Age at Diagnosis: 8 (Mos.).
Infected tissue: synovial membrane of the right knee joint Figure: 154.
Roentgen images: increased soft tissue density of the right knee joint Figure: 155.
Ultrasound images: hypoechoic fluid intra-articular collection, inducing enlargement of the joint space and distension of the suprapatellar bursa of the right knee joint Figure: 156.
Diagnosis: Septic arthritis of the right knee joint.

Case: 70
Age at Diagnosis: 9.2 (Yrs. + Mos.).
Infected tissue: right and left thigh muscles.
Roentgen images: increased soft tissues density of the right and left thigh Figure: 159.
Ultrasound images: a hypoechoic fluid collection with debris at the level of the muscular plane in the anterior region of the right thigh and posterior region of the left thigh Figure: 160.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle + Tropical Pyomyositis of the left hamstring muscles group.
Case: 71
Age at Diagnosis 2.2 (Yrs. + Mos.).
Infected tissue: right thigh muscle Figure: 161.
Roentgen images: increased soft tissue density of the right thigh Figure: 162.
Ultrasound images: an extensive hypoechoic fluid collection with debris in group muscles group of the right thigh Figure: 163.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle.

Case: 72
Age at Diagnosis 8 (Mos.).
Infected tissue: synovial membrane of the right hip.
Roentgen images: increased soft tissue density of the right hip joint + joint space distension Figure: 164.
Ultrasound images: a hypoechoic fluid collection with debris inside the right hip joint, causing distension of the joint capsule (iliofemoral ligament) Figure: 165.
Diagnosis: Septic arthritis of the right hip joint.

Case: 73
Age at Diagnosis 12 (Yrs.).
Infected tissue: abdomen muscle.
Roentgen images: silhouette erasure of the right ilio psoas muscle + lumbar scoliosis + right hip flexion + increased density of the right anterior thigh Figure: 166.
Ultrasound images: hypoechoic fluid collection with intramuscular debris of the right ilio psoas muscle Figure: 167.
Diagnosis: Tropical Pyomyositis of the right iliopsoas muscle.

Case: 74
Age at Diagnosis 1.11 (Yr. + Mos.).
Infected tissue: abdomen muscle.
Roentgen images: increased soft tissue density adjacent to iliac bone Figure: 168.
Ultrasound images: a hypoechoic fluid collection with debris, producing an alteration in the texture in the muscle fibers of the right iliopsoas muscle Figure: 169.
Diagnosis: Tropical Pyomyositis of the right iliopsoas muscle.

Case: 75
Age at Diagnosis 4.9 (Yrs. + Mos.).
Infected tissue: abdomen muscle Figure: 170.
Roentgen images: silhouette erasure of the right iliopsoas muscle.
Ultrasound images: heterogeneous hypoechoic fluid collection, causing fibers disorganization of the right iliopsoas muscle Figure: 171, Figure: 172.
Diagnosis: Tropical Pyomyositis of the right iliopsoas muscle.
Case: 76
Age at Diagnosis 1.7 (Yr. + Mos.).
Infected tissue: left shoulder muscle Figure: 173.
Roentgen images: increased soft tissue density of the left shoulder Figure: 174.
Ultrasound images: heterogeneous hypoechoic fluid collection on shoulder of the left deltid muscle Figure: 175.
Diagnosis: Tropical Pyomyositis of the left deltid muscle.

Case: 77
Age at Diagnosis 5 (Yrs.).
Infected tissue: right hip bone.
Roentgen images: supra-acetabular irregularity of the right iliac bone Figure: 176.
Ultrasound images: fluid collection predominantly hyperechogenic adjacent to the iliac bone, promoting irregularity in its contour Figure: 177.
Diagnosis: Osteomyelitis of the right iliac bone.

Case: 78
Age at Diagnosis 1.11 (Yr. + Mos.).
Infected tissue: right thigh muscle.
Roentgen images: increased soft tissue density of the right thigh Figure: 178.
Ultrasound images: intramuscularly hypoechoic fluid collection in the lateral region of the right thigh Figure: 179, Figure: 180.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle.

Case: 79
Age at Diagnosis 4.7 (Yrs. + Mos.).
Infected tissue: right hip muscle.
Roentgen images: increased soft tissue density in the lateral region of the right hip Figure: 181.
Ultrasound images: hypoechoic fluid collection, conditioning changes in the texture of the right gluteal maximus muscle Figure: 182.
Diagnosis: Tropical Pyomyositis of the right gluteus maximus muscle.
Case: 80
Age at Diagnosis 1.4 (Yr. + Mos.).
Infected tissue: left axillary muscle.
Roentgen images: increased soft tissue density in the lateral region of the left chest Figure:183.
Ultrasound images: intramuscular hypoechogenic fluid collection Figure:184.
Diagnosis: Tropical Pyomyositis of the left latissimus dorsi muscle.

Case: 81
Age at Diagnosis 6.6 (Yrs. + Mos.).
Infected tissue: right leg bone.
Roentgen images: normal bone and soft tissue structure Figure:185.
Ultrasound images: hypoechogenic fluid collection adjacent to the cortical bone, promoting elevation of the periosteum in the distal third of the right tibia Figure:186.
Diagnosis: Osteomyelitis of the right tibia.

Case: 82
Age at Diagnosis 2.9 (Yrs. + Mos.).
Infected tissue: right thigh muscle.
Roentgen images: increased soft tissue density of the right thigh Figure: 187.
Ultrasound images: intramuscular hypoechogenic fluid collection well delimited of the right thigh Figure: 188.
Diagnosis: Tropical Pyomyositis of the right quadriceps muscle.

Case: 83
Age at Diagnosis 8 (Yrs.).
Infected tissue: right hip muscle.
Roentgen images: increased soft tissue density in the gluteal region at the upper third of the right thigh Figure:189.
Ultrasound images: hypoechogenic fluid collection with debris inside, causing alteration of the gluteal muscle structure of the right hip Figure: 190.
Diagnosis: Tropical Pyomyositis of the right gluteus maximus muscle.

Case: 84
Age at Diagnosis 10.2 (Yrs. + Mos.).
Infected tissue: bone of the right knee joint.
Roentgen images: increased soft tissue density in the prepatellar region of the right knee joint Figure: 191.
Ultrasound images: hypoechogenic fluid collection with debris inside in the prepatellar region, observing fistular course + distension of the suprapatellar bursa of the right knee joint Figure: 192.
Diagnosis: Osteomyelitis of the right patella.

Case: 85
Age at Diagnosis 1.5 (Yrs. + Mos.).
Infected tissue: right hip muscle.
Roentgen images: increased soft tissue density in the gluteal region of the right hip Figure: 193.
Ultrasound images: hypoechogenic fluid collection of the group muscle of the right gluteal hip region Figure: 194.
Diagnosis: Tropical Pyomyositis of the right gluteus maximus muscle.
Case: 86
Age at Diagnosis 9 (Yrs.).
Infected tissue: bone (rib) of the chest.
Roentgen images: permeative lesions with changes in structure and morphology of the fourth right rib Figure: 195.
Ultrasound images: periosteal hypoechogenic fluid collection + hyper-echogenic line irregularity of the right fourth rib Figure: 196.
Diagnosis: Osteomyelitis of the right fourth rib.

Case: 87
Age at Diagnosis 9.3 (Yrs. + Mos.).
Infected tissue: left thigh muscle.
Roentgen images: increased soft tissue density in the posterior region of the left thigh Figure: 197.
Ultrasound images: hypoechoic fluid collection with imprecise contours in the muscle at the posterior region of the left thigh Figure: 198.
Diagnosis: Tropical Pyomyositis of the left hamstring muscle.

Case: 88
Age at Diagnosis 10 (Mos.).
Infected tissue: synovial membrane.
Roentgen images: enlargement of the joint space + subluxation + interruption of the Shenton's arch of the right hip Figure: 199.
Ultrasound images: hypoechogenic fluid intra-articular collection with debris inside + distention at the articular capsule (iliofemoral ligament) of the right hip joint Figure: 200.
Diagnosis: Septic arthritis of the right hip joint.

Case: 89
Age at Diagnosis 10.2 (Yrs. + Mos.).
Infected tissue: right thigh bone.
Roentgen images: increased thigh soft tissue density + permeative lesions in the middle third + destruction of the posterior cortical of the right femur + apposition of multiple periosteum Figure: 201.
Ultrasound images: extensive heterogeneous collection adjacent to the bone with an elevation of the periosteum and irregularity at the cortical bone of the right femur Figure: 202.
Diagnosis: Osteomyelitis of the right femur.

Case: 90
Age at Diagnosis 6 (Mos.).
Infected tissue: synovial membrane.
Roentgen images: increased soft tissue density of the right hip joint + increased joint space Figure: 203.
Ultrasound images: intra-articular fluid collection with debris inside + anterior distension of the joint capsule (iliofemoral ligament of the right hip joint) Figure: 204.
Diagnosis: Septic arthritis of the right hip joint.

Case: 92
Age at Diagnosis (Mos.) 11.
Infected tissue: Synovial Membrane.
Roentgen images: increased soft tissue density of the right knee Figure: 207.
Ultrasound images: intra-articular hypoechogenic fluid collection, causing suprapatellar bursa distention from the right knee Figure: 208, Figure: 209.
Diagnosis: Septic arthritis of the right knee joint.
Case: 91
Age at Diagnosis 12 (Yrs.).
Infected tissue: right thigh bone.
Roentgen images: increased density of the soft tissue of the right thigh + permeative lesion in the lower middle third of the right femur + fusi-
form thickening of the bone, including sequestrum with an aspect of the
involucrum at the diaphysis level Figure: 205.
Ultrasound images: hypoechoic fluid collection adjacent to the bone
shaft + rupture and irregularity of the cortex of the right femur Figure:
206.
Diagnosis: Osteomyelitis of the right femur.

Acknowledgments

The authors wish to thank Paulo Vinicius Valladao Pinheiro,
Angela Marta Marquini, and Carlos Brown Scavarda for their
review, advice, encouragement and help in preparing the
manuscript.

Consent

Written informed consent from parents/guardians for
publication of this report and accompanying images was obtained
from the Orthopedic/Radiological Department, Jesus Children's
Hospital, Rio de Janeiro, Brazil is available.

Disclosure

None of the authors received payments or services, either
directly or indirectly, i.e., via his or her institution of any aspect of
this work. None of the authors, or their intuition(s), have had any
financial relationship, before submission of this work, with any
entity in the biomedical arena that could be perceived to influence
or have the potential to influence what is written in this article.
Also, no author has had any other relationships or has engaged in
any other activities, that could be perceived to influence or have
the potential to influence what is written in this work.

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