The Bone & Joint Journal

Supplementary Material

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Table i. Consensus criteria.

Consensus in	75% or more participants scored it as 'critical for inclusion' and less than 25% of participants scored it as 'not important for inclusion'
Consensus out	75% or more participants scored it as 'not important for inclusion' and less than 25% of participants scored it as 'critical for inclusion'
No consensus	Anything else not included in the other two categories.

BSCOS MSK Infection Delphi Survey R1 Results

Table ii. Respondent background and progression - Delphi survey Round 1. Total respondents n = 146.

Current place of employment, n (%)	
Regional referral centre	91 (62.3)
Other	55 (37.7)
Children treated with MSK infection annually, n (%)	
0	9 (6.2)
1 to 5	44 (30.1)
6 to 9	34 (23.3)
10+	59 (40.4)
Survey progression, n (%)	
Proceed to statement ranking	133 (91.1)
Did not proceed to statements	13 (8.9)

MSK, musculoskeletal.

ROUND 1

- Total number of outcomes: 43
- Number of outcomes reached 'consensus in': 32
- Number of outcomes reached 'consensus out': 0
- Number of outcomes reached 'no consensus': 11

Table iii. Descriptive analysis of statements included in the Delphi survey Round 1.

Aspect of care	BSCOS Respondents (n = 133)				
	N (%)			Median	IQR
	1-3	4-6	7-9		
Assessment, Investigation and Diagnosis					
1. All children suspected to have musculoskeletal infection should be jointly managed by paediatricians and orthopaedic surgeons.	18 (14)	34 (26)	81 (61)	7	6 to 9
2. In addition to examination of the affected limb and spine, a full systematic examination including upper respiratory tract and ears should be performed and documented by a paediatrician or other appropriate professional	9 (7)	24 (18)	100 (75)	8	7 to 9
3. Cellulitis in limbs is commonly associated with deeper MSK related infection in children and must be investigated further	25 (19)	46 (35)	62 (47)	6	4 to 8
4. No single clinical algorithm for detecting MSK infection has been proven to have high sensitivity and specificity, and so they should not be relied upon.	14 (11)	53 (40)	66 (50)	6	5 to 8
5. FBC, CRP, ESR and blood cultures are the minimum baseline laboratory investigations in suspected cases of MSK infection	5(4)	9 (7)	119 (89)	9	8 to 9

6. Plain radiographs of the affected bone/joint should be performed in all cases.	8 (6)	11 (8)	114 (86)	9	8 to 9
7. MRI is the gold standard second line imaging investigation if the child's condition allows.	8 (6)	18 (14)	107 (80)	9	7 to 9
8. Ultrasound of the affected bone/joint should be considered when MRI is not possible	8 (6)	17 (13)	108 (81)	8	7 to 9
9. Where a joint is aspirated, the fluid should be sent to the laboratory in both plain universal culture pot and also in blood culture bottles.	6 (5)	20 (15)	107 (80)	8	7 to 9
10. The majority of uncomplicated cases of osteomyelitis do not require biopsy nor surgery, with biopsy reserved for cases of diagnostic uncertainty or where symptoms are not settling with treatment.	4 (3)	12 (9)	117 (88)	8	7 to 9
11. Empirical intravenous antibiotics should be started immediately in any child who meets the sepsis-6 criteria, even if prior to a diagnosis of MSK Infection.	9 (7)	13 (10)	111 (83)	9	7 to 9
12. Antibiotics for septic arthritis or osteomyelitis should not be delayed in order to obtain specimens from the site of infection.	36 (27)	42 (32)	55 (41)	5	3 to 8
13. Antibiotics can be delayed to take adequate samples if a child's condition is stable and surgery can be performed in a timely fashion.	12 (9)	14 (11)	107 (80)	8	7 to 9
14. A raised CRP or ESR in a child with an appropriate history and examination findings is suspicious for MSK infection.	3 (2)	16 (12)	114 (86)	8	7 to 9

15. A normal CRP or ESR does not exclude MSK infection if early on in the disease course.	8 (6)	16 (12)	109 (82)	8	7 to 9
16. Isotope bone scan has no role in the investigation of MSK Infection in childhood.	41 (31)	47 (35)	45 (34)	5	3 to 7
17. An echocardiogram should be considered in conjunction with the paediatricians in children with persistent pyrexia, with or without signs of endocarditis	9 (7)	35 (26)	89 (67)	7	6 to 8
Treatment					
18. In septic arthritis, urgent irrigation and drainage of the joint is the accepted standard, repeated if necessary.	3 (2)	2 (2)	128 (96)	9	8 to 9
19. Osteomyelitis in bones adjacent to the joint should be considered in cases of septic arthritis.	3 (2)	7 (5)	123 (92)	8	8 to 9
20. In acute haematogenous osteomyelitis, intravenous antibiotics are first line treatment, with surgical intervention indicated when response is suboptimal.	4 (3)	19 (14)	110 (83)	8	7 to 9
21. Empiric antibiotics for osteomyelitis should be guided by local guidelines and the sepsis-6 pathway.	3 (2)	13 (10)	117 (88)	8	8 to 9
22. In osteomyelitis a large collection of pus on imaging should be surgically drained, especially in non-responders	3 (2)	9 (7)	121 (91)	9	8 to 9
23. Growth plates should not be violated during surgery for osteomyelitis.	11 (8)	24 (18)	98 (74)	8	6 to 9
24. In surgery for osteomyelitis, adjacent joint effusions should be aspirated, and joint washout performed if pus is present.	6 (5)	11 (8)	116 (87)	8	7 to 9

25. In both septic arthritis and osteomyelitis, consider long line access at the earliest opportunity, particularly in the younger child	6 (5)	7 (5)	120 (90)	9	8 to 9
26. Convert to oral antibiotics when inflammatory markers (CRP/ESR) are reducing.	6 (5)	36 (27)	91 (68)	7	6 to 8
27. Temperature, CRP, ESR, and clinical improvement are all important to monitor response, guide treatment and exclude chronic osteomyelitis	4 (3)	14 (11)	115 (86)	8	7 to 9
28. Clinical examination and x-ray imaging are both necessary to assess medium and long term complications including fracture in osteomyelitis, joint contracture, growth arrest, hyaline cartilage loss, and Brodie Abscess formation.	4 (3)	17 (13)	112 (84)	8	7 to 9
29. Total antibiotic duration should be guided with local MDT discussion, and continued at least until inflammatory markers are normal.	4 (3)	13 (10)	116 (87)	8	7 to 9
30. Pyomyositis can present similarly to septic arthritis or osteomyelitis, especially around the hip, and MRI is the investigation of choice.	3 (2)	6 (5)	124 (93)	9	8 to 9
31. Pyomyositis can often be treated successfully without surgery, with clinical examination and blood tests helpful for monitoring response.	6 (5)	15 (11)	112 (84)	8	7 to 9
Service, Pathways and Networks					
32. Children should be treated in their local hospital where safe and possible.	12 (9)	24 (18)	97 (73)	8	6 to 9
33. Each child should be treated by a multidisciplinary team, with a minimum of 2 disciplines	8 (6)	21 (16)	104 (78)	8	7 to 9

(a surgeon and a paediatrician or microbiologist) with further input from an infectious diseases team where required.					
34. Admit all children with musculoskeletal infection for initial management Each region must agree pathways in which specialist hospitals and supra-regional support district general hospitals in managing children with bone and joint infections.	6 (5)	22 (17)	105 (79)	8	7 to 9
35. Each region must agree pathways in which specialist hospitals and supra-regional support district general hospitals in managing children with bone and joint infections.	5 (4)	20 (15)	108 (81)	8	7 to 9
36. Complex cases should be transferred promptly to specialist centres.	3 (2)	7 (5)	123 (92)	8	8 to 9
37. The receiving team in specialist centre should be defined – paediatrician, or paediatric orthopaedic surgeon, or both.	6 (5)	12 (9)	115 (86)	8	7 to 9
38. A nationally accepted proforma for referral that enshrines the agreed criteria for diagnosis and initial management would be desirable based on the statements above	15 (11)	33 (25)	85 (64)	7	5 to 9
39. The management of children with bone and joint infections under non-specialist care (i.e. at a local hospital) must be discussed with a (designated) paediatric specialist in the regional network.	22 (17)	51 (38)	60 (45)	6	4 to 8
40. If a child is well enough for discharge, but cannot be converted to orals and requires	3 (2)	12 (9)	118 (89)	8	7 to 9

long term IV antibiotics for their treatment, then there should be provision for IV treatment as an outpatient or in the community.					
41. Consider repatriation of complex cases from a specialist hospital to their local hospital when treatment plan is finalised.	4 (3)	23 (17)	106 (80)	8	7 to 9
42. Each child should have a discharge plan including dates, location and duration of outpatient appointments according to predicted complications.	10 (8)	19 (14)	104 (78)	8	7 to 9
43. Follow-up should be under an interested specialist who anticipates bone fragility in osteomyelitis, monitors growth, and can manage consequences of growth disturbance and joint damage.	10 (8)	21 (16)	102 (77)	8	7 to 9

BSCOS, British Society for Children's Orthopaedic Surgery; IQR, interquartile range; MDT, multidisciplinary team; MSK, musculoskeletal.
Green cells denote statements gaining "Consensus in".

BSCOS MSK Infection Delphi Survey R2 Results

Table iv. Respondent background and progression - Delphi survey Round 2. Total respondents n = 127.

Current place of employment, n (%)	
Regional referral centre	84 (66.1)
Other	43 (33.9)
Children treated with MSK infection annually, n (%)	
0	11 (8.7)
1 to 5	32 (25.2)
6 to 9	30 (23.6)
10+	54 (42.5)
Survey progression, n (%)	
Proceed to statement ranking	109 (85.8)

Did not proceed to statements	18 (14.2)

MSK, musculoskeletal.

Table v. Consensus criteria.

Consensus in	75% or more participants scored it as 'critical for inclusion' and less than 25% of participants scored it as 'not important for inclusion'
Consensus out	75% or more participants scored it as 'not important for inclusion' and less than 25% of participants scored it as 'critical for inclusion'
No consensus	Anything else not included in the other two categories.

ROUND 2

- Total number of outcomes: 8
- Number of outcomes reached 'consensus in': 8
- Number of outcomes reached 'consensus out': 0
- Number of outcomes reached 'no consensus': 0

Table vi. Descriptive analysis of statements included in the Delphi survey Round 2.

Aspect of care	BSCOS Respondents (n = 109)				
	N (%)			Median	IQR
	1-3	4-6	7-9		
Assessment, Investigation and Diagnosis					
1. All children suspected to have musculoskeletal infection should be considered for joint management by orthopaedic surgeons and paediatricians, especially in cases of diagnostic uncertainty.	2 (2)	11 (10)	96 (88)	8	8 to 9
2. In cases of cellulitis that do not settle with standard treatment, deeper infection should be considered.	2 (2)	10 (9)	97 (89)	8	7 to 9

3. No single clinical algorithm for detecting MSK infection has been proven to be completely reliable, so should be considered in conjunction with history and examination.	1 (1)	7 (6)	101 (93)	8	8 to 9
4. Isotope bone scan should be avoided where MRI is available, to reduce radiation to children.	7 (6)	15 (14)	87 (80)	8	7 to 9
Treatment					
5. Every effort should be made to protect growth plates during surgery for osteomyelitis.	1 (1)	7 (6)	101 (93)	9	8 to 9
6. Convert to oral antibiotics when child is clinically improving and inflammatory markers are falling.	0 (0)	11 (10)	98 (90)	8	7 to 9
Service, Pathways and Networks					
7. Children should be treated at their local hospital if the local expertise is sufficient for the nature of the infection present.	2 (2)	6 (6)	101 (93)	8	7 to 9
8. Clinicians managing children with MSK infection at local hospitals should have a low threshold for discussing cases with a specialist unit.*	2 (2)	17 (16)	90 (83)	8	7 to 9

*Note: In this context our definition of a local hospital is one with general orthopaedic surgeons and a paediatric ward, but no paediatric orthopaedic surgeons.

BSCOS, British Society for Children's Orthopaedic Surgery; IQR, interquartile range; MSK, musculoskeletal.

Green denotes statements gaining "Consensus in".