

Unified Classification System for Periprosthetic Fractures (UCPF)

Principles

The UCPF is based upon the following factors:

1. The fracture location may involve either the bone supporting the implant or distant to it.
2. The stability of the components must be assessed to determine if the bone implant surface is stable prior to fracture and after fracture.
3. The adequacy of the bone stock and bone strength supporting the implant must be sufficient to support internal fixation or a revision without additional major reconstruction.
4. For clinical use, the definitions and terminology of the UCPF are used. In order to maintain consistency in coding and allow easy data retrieval for data collection, the UCPF has been modified so that the AO/OTA bone code appears first.
5. The UCPF code follows as a qualification in square brackets.
6. Fractures about or in a bone with a nonarthroplasty implant are coded using the universal modifier [12] following the AO/OTA fracture code.

Classification and coding process

1. The bone is identified by the AO/OTA code (see **Fig 1**). The fracture morphology may be classified in as much detail as needed.
2. The UCPF for the joint involved is added as a modifier in square brackets [] after the bone code (see **Fig 1**).
3. The fracture type is based on the location of the fracture in relation to the implant as follows:
 - **Apophysis adjacent implant with no effect on implant stability—Type A**
 - Tuberosities of the humerus
 - Epicondyles or olecranon of distal humerus
 - Trochanters and epicondyles of femur
 - Spines of the pelvis
 - Poles or tips of the patella
 - Tibial tuberosity and malleoli
 - **Bed of the implant or around the implant—Type B**
 - Good bone no implant loosening—Type B1
 - Good bone but implant loose—Type B2
 - Poor bone or defect, implant loose—Type B3
 - **Clear of the implant—Type C**
 - **Dividing the bone between two implants—Type D**
 - **Each of the two bones supporting the implant—Type E**
 - **Facing and articulating with a hemiarthroplasty—Type F**

The table provides the unified codes that follow the fracture classification.

Example: A spiral fracture about a femoral prosthesis of a total hip, which on x-rays shows loosening of the implant but good bone stock = 32A1[IVB2]

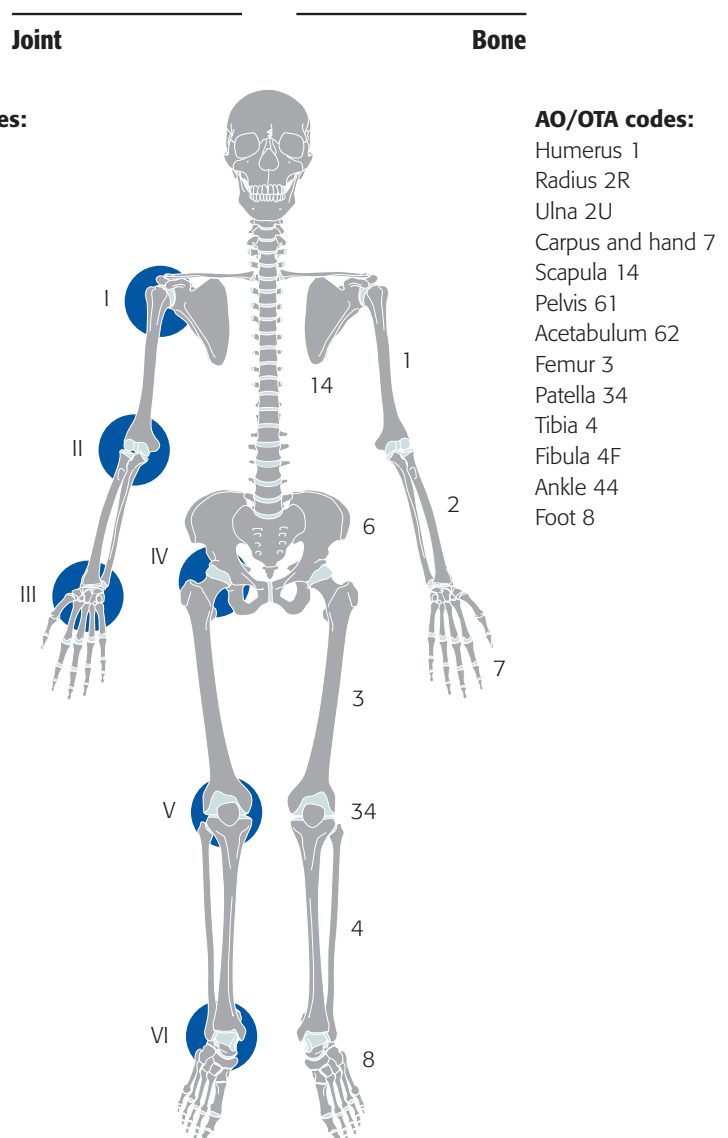





Fig 1 AO/OTA bone codes and UCPF joint codes.

Type		I Shoulder 		II Elbow 		III Wrist 	
		I.14	I.1	II.1	II.2	III.2	III.7
		Glenoid/scapula	Humerus, proximal	Humerus, distal	Ulna/radius, proximal	Radius/ulna, distal	Carpus/metacarpals
A Apophyseal or extraarticular/periarticular	A1 Avulsion of	Coracoid process	Greater tuberosity	Lateral epicondyle	Olecranon tip	Radial styloid	–
	A2 Avulsion of	Acromion	Lesser tuberosity	Medial epicondyle	Coronoid process, radial tuberosity	Ulnar styloid, if ulna retained	–
B Bed of the implant or around the implant	B1 Prosthesis stable, good bone	Glenoid implant stable, good bone	Humeral implant stable, good bone	Humeral implant stable, good bone	Ulnar implant stable, good bone	Radial implant stable, good bone	Carpal/metacarpal implant stable, good bone
	B2 Prosthesis loose, good bone	Glenoid implant loose, good bone	Humeral implant loose, good bone	Humeral implant loose, good bone	Ulnar implant loose, good bone	Radial implant loose, good bone	Carpal/metacarpal implant loose, good bone
	B3 Prosthesis loose, poor bone or bone defect	Glenoid implant loose, poor bone, defect	Humeral implant loose, poor bone, defect	Humeral implant loose, poor bone, defect	Ulnar implant loose, poor bone, defect	Radial implant loose, poor bone, defect	Carpal/metacarpal implant loose, poor bone, defect
C Clear of or distant to the implant	–	Body of the scapula	Distal to the implant	Proximal to the implant	Distal to the implant	Proximal to the implant	Distal metacarpals
D Dividing the bone between two implants or interprosthetic or intercalary	–	–	Between shoulder and elbow arthroplasties, close to the shoulder	Between shoulder and elbow arthroplasties, close to the elbow	–	Between wrist and radial-head prosthesis	–
E Each of two bones supporting one arthroplasty or polyperiprosthetic	–	Scapula and humerus		Humerus and ulna/radius		Radius/ulna and carpus/metacarpals	
F Facing and articulating with a hemiarthroplasty	–	Fracture of the glenoid articulating with the humeral hemiarthroplasty	–	Distal humeral fracture articulating with the radial-head prosthesis	–	–	–

IV Hip		V Knee			VI Ankle		Type
IV.6	IV.3	V.3	V.4	V.34	VI.4	VI.8	
Acetabulum/pelvis	Femur, proximal	Femur, distal	Tibia, proximal	Patella	Tibia, distal	Talus	A Apophyseal or extraarticular/periarticular
Anterior inferior and superior iliac spine	Greater trochanter	Lateral epicondyle	Medial or lateral plateau, nondisplaced	Disrupted extensor, proximal pole	Tip of the medial malleolus	–	
Ischial tuberosity	Lesser trochanter	Medial epicondyle	Tibial tubercle	Disrupted extensor, distal pole	Tip of the lateral malleolus	–	B Bed of the implant or around the implant
Acetabular rim or good bone	Stem stable, good bone; Surface replacement: femoral neck	Proximal to stable stem, good bone	Stem and component stable, good bone	Intact extensor, implant stable, good bone	Transverse or medial malleolus shear, good bone	Body of the talus, good bone	
Loose cup, good bone	Loose stem, good bone; Surface replacement: loose implant, no proximal femoral bone loss	Proximal to loose stem, good bone	Loose component/stem, good bone	Loose implant, good bone	Tibial implant loose, good bone	Body of the talus, loose, good bone	C Clear of or distant to the implant
Loose cup, poor bone, defect; Pelvic discontinuity	Loose stem, poor bone, defect; Surface replacement: loose implant, bone loss	Proximal to loose stem, poor bone defect	Loose component/stem, poor bone, defect	Loose implant, poor bone	Tibial implant loose, poor bone, defect	Body of the talus, bone defect	
Pelvic/acetabular fractures distant to the implant	Distal to the implant and cement mantle	Proximal to the implant and cement mantle	Distal to the implant and cement mantle	–	Proximal to the implant	Neck or head of the talus	D Dividing the bone between two implants or interprosthetic or intercalary
Pelvic fracture between bilateral total hip arthroplasties	Between hip and knee arthroplasties, close to the hip	Between hip and knee arthroplasties, close to the knee	Between ankle and knee arthroplasties, close to the knee	–	Between knee and ankle arthroplasties, close to the ankle	Between an ankle and talonavicular arthroplasties	
Pelvis and femur		Femur and tibia/patella			Tibia and talus		E Each of two bones supporting one arthroplasty or polyperiprosthetic
Fracture of the acetabulum articulating with the femoral hemiarthroplasty	–	Fracture of femoral condyle articulating with tibial hemiarthroplasty	–	Fracture of the patella that has no surface replacement and articulates with the femoral component of the total knee arthroplasty	–	–	F Facing and articulating with a hemiarthroplasty

Reference

Duncan CP, Haddad FS. Classification. In: Schütz M, Perka C, ed. *Periprosthetic Fracture Management*. Stuttgart: Georg Thieme; 2013:47–90.

