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Skeletal circulation in clinical practice, R.K. Aaron, editor (World Scientific Publishing Co. Pte. Ltd., Singapore) 2016. 328 pages. Price: US$ 150.00

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This book is a good effort to provide up-to-date information of the circulatory physiology of bone along with its clinical application in common orthopaedic disorders. It provides an in-depth understanding of the basics and the recent advances in an area which is least understood and difficult to explain. The simplicity with which the book puts forward the available evidences and its translation into clinical practise is commendable.

This book has been divided into three parts focussing on the physiology of bone circulation, the basics as well as advances in the techniques of measurement of bone circulation and pathophysiologic changes in skeletal circulation with a focus on individual bone diseases. The first chapter describes the basics of blood circulation in bone physiology, effect of ischaemia and hypoxia on bone circulation, importance of angiogenesis in osteogenesis and their clinical implications. In the second chapter, 'Molecular Transport in Musculoskeletal Health and Disease', molecular transport across the cell is depicted in skeletal physiology with a focus on the knee joint and exercise-induced modulation of molecular transport and their effects on bone physiology. In the chapter, 'The Microsphere Method for Investigating Bone Blood Flow', the description of the method and explanation of auto-regulation of blood flow in the bone is noteworthy to an extent that its clinical effect on application of cooling and tourniquet on bone physiology becomes self-explanatory. In the end the authors also point out the relevance of blood flow in the pathophysiology of osteoarthritis.

The next couple of chapters describe advanced methods for the detection of blood flow abnormalities in bone. While Laser doppler flowmetry (LDF) allows invasive and non-invasive measurement of blood flow within tissues, photoplethysmography (PPG) is a non-invasive optical technique that can be used to measure the real time variation of clinically relevant physiological parameters. The role of these techniques in the detection of osteonecrosis of the femoral head and the viability of its blood supply after fracture and bone metastasis has been well highlighted by the authors. Thereafter, the utility of MRI and PET scan, commonly available modalities for the detection of perfusion abnormality of bone circulation in relation to the pathophysiology of osteoarthritis, detection of occult femoral head fracture, osteoporotic fracture and skeletal metastasis due to variation in blood supply of diseased skeletal tissue are described.

The third and the last part of the book focuses on individual diseases with pathophysiologic changes in skeletal circulation. Two chapters are dedicated to describe the pathophysiology of osteonecrosis of the femoral head in various diseases. The authors have demarcated intra-osseous and extra-osseous causes with key pathophysiologic changes responsible for osteonecrosis in a particular disease that can be used as a target for the prevention of osteonecrosis. The next chapter provides a detailed insight into the vascularity of different bones, changes in this vascuarity following a fracture and factors governing the repair of bone in relation to vascularity. A special emphasis has been laid on femoral neck fractures, the associated pathophysiological changes, and their management strategies. The chapter, 'Joint Inflammation and Synovitis' covers the basic pathophysiology of joint inflammation and synovitis, various imaging modalities used for the diagnosis with their pros and cons. The author also provides a bird's eye view of the advanced imaging modalities that can be used routinely in future for early diagnosis.

The chapter, 'Circulatory Pathology in Osteoarthritis' is the most interesting chapter of this book as it clearly delineates the changes in the skeletal vascularity causing osteoarthritis of the hip, and application of DCE (dynamic contrast-enhanced)-MRI and PET scan for imaging. The next chapter elucidates the effect of mechanical loading causing a change in fluid flow of the musculoskeletal system, a unique concept to prevent and treat osteoporosis. The last chapter describes paediatric and adolescent disorders affected by a disturbance in the vascularity of proximal femur. In adolescents, traumatic hip dislocation and femoral neck fracture are pertinent where outcomes are primarily affected by the vascularity disturbance whilst in the paediatric age group, Perthes disease and slipped capital femoral epiphysis (SCFE) are the major ones. The explanation of the pathological changes in Perthes disease affecting the femoral head and their prevention by intervening at the appropriate time is commendable.

This book is well structured and written in lucid language. It is an invaluable guide for practitioners, postgraduate students, more so for the teachers for understanding the pathophysiolgy of various disorders affecting the skeletal circulation. This book is primarily recommended for orthopaedic surgeons, however, it is also recommended for experts interested in planning research in this area.

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