1 Introduction ................................................................. 1
  1.1 Ankle Joint Anatomy .............................................. 2
    1.1.1 Ankle Biomechanics ....................................... 4
    1.1.2 Loading on the Ankle ....................................... 5
    1.1.3 Kinematics of the Ankle .................................... 7
  1.2 Ankle Joint Problems that Lead to Surgical Treatment .......... 7
  1.3 Ankle Joint Treatment .......................................... 9
    1.3.1 Ankle Fusion ................................................. 10
    1.3.2 Total Ankle Replacement (TAR) .......................... 10
  1.4 Total Ankle Replacement (TAR) ................................ 12
    1.4.1 Agility TAR (DePuy, Warsaw, iN, USA) ............... 12
    1.4.2 Scandinavian Total Ankle Replacement (STAR)
          (Waldmar Link, Hamburg, Germany) ...................... 13
    1.4.3 Buechel-Pappas (BP) TAR ................................ 14
    1.4.4 Bologna, Oxford Total Ankle Replacement (BOX) ...... 15
  1.5 Complications .................................................. 15
  References .......................................................... 16

2 Contact Pressure of Total Ankle Replacement (TAR) ............. 19
  2.1 Geometric Model ................................................ 19
  2.2 Finite Element Analysis ....................................... 20
    2.2.1 Development of Finite Element Analysis of Gait
          Cycle ...................................................... 21
  2.3 Contact Analysis ............................................... 25
    2.3.1 Contact Pressure of Total Ankle Replacement (TAR) ... 26
  2.4 Sliding Distance ............................................... 27
  2.5 Validity of Contact Analysis .................................... 28
    2.5.1 Mesh Sensitivity Test .................................... 29
    2.5.2 Contact Analysis ......................................... 30
  References .......................................................... 31
3 Wear of Total Ankle Replacement (TAR) ........................................... 33
  3.1 Fundamental of Wear Modelling ............................................. 33
    3.1.1 Wear of Total Ankle Replacement (TAR) .......................... 34
  3.2 Wear Model of Total Ankle Replacement (TAR) ......................... 35
  3.3 Update Contact Geometry of Total Ankle Replacement (TAR) ......... 36
  3.4 Wear Sensitivity Study ................................................... 38
References ............................................................................. 40

4 Effect of Design Parameter Towards Wear Generation .................... 43
  4.1 Parametric Study ................................................................ 43
    4.1.1 Thickness of Meniscal Bearing ................................... 43
    4.1.2 Radial Contact of Meniscal Bearing ............................. 47
References ............................................................................. 52

5 Conclusion ........................................................................... 55
Wear Prediction on Total Ankle Replacement
Effect of Design Parameters
Saad, A.P.B.M.; Syahrom, A.; Harun, M.N.; Kadir, M.R.A.
2016, XIII, 55 p. 41 illus., 35 illus. in color., Softcover
ISBN: 978-3-319-21722-2