Basketball Footwear Design: The Guard Position
Integration of performance, injury prevention and style.

Kong Deyu, 2018
Abstract

Basketball is the world’s most popular indoor team sport and was the most watched team sport of the 2016 Rio Olympic Games. Basketball shoes are frequently linked to player performance and are arguably the most important innovative product connected to the sport. Benefits attributed to this product include: reducing injury rates, minimizing energy expenditure and enhancing athletic performance.

While the large number of basketball players presents a commercial market to footwear manufacturers, basketball shoes are not only worn by basketball players. The popularity as a spectator sport has expanded the commercial market, as basketball fans purchase shoes to emulate their heroes. In addition to this, sneakerheads (a subculture of sneaker lovers) purchases new and innovative designs as fashion apparel as an integral part of their lifestyle. Designing a new shoe that provides professional players with performance benefits and fashion aficionados with fresh interesting designs is essential, as high-profile players often represent fashion brands.

Basketball has five different player positions on court, each with specialised locomotion requirements and high physical contact. Understanding performance requirements of specific positions, and human physiology constraints allows design to extract new benefits, advancing player performance. Integrating this advantage with aesthetic and fashion development provides the opportunity to develop a fresh new concept basketball shoe. This design focuses on a shoe that provides injury prevention, performance and a fresh aesthetic design for professional basketball players in the guard position.

Keywords:
Basketball, footwear design, injury prevention, performance, fashion, integration, industrial design
Acknowledgements

I acknowledged the support of my Massey University supervisors, Associate Professor Rodney Adank and Senior Lecturer Sue Prescott; my family, both in China and in New Zealand; the helpful staff at Massey University 3D Workshop, Fab Lab and throughout the Wellington campus, particularly Craig Cherrie, Librarian; the players and coach of the Wellington Saints basketball team; Kenny McFadden, fabulous coach at the Wellington basketball academy.
# Table of Contents

Abstract iii  
Acknowledgements iv  
1.0. Introduction 1  
2.0. Research Method 2  
3.0. Research context 3  
  3.1. Market potential 3  
  3.2. Foot anatomy 5  
  3.3. Basketball Injuries 6  
  3.4. Player Position 8  
  3.5. Elements of Basketball Shoes 11  
  3.6. Design Precedents 13  
    3.6.1. Technology and Material Development. 17  
  3.7. Summary of research context 19  
4.0. Primary Research 21  
  4.1. Lead User Interviews 21  
  4.2. Practical Participation 22  
  4.3. User Trial 23  
  4.4. Reverse Engineering 27  
  4.5. Summary of primary research 30  
5.0. Design Considerations 32  
6.0. Design Methodology 33  
  6.1. Concept Generation 33  
    6.1.1. Detail Drawing 39  
  6.2. Design Development 41  
    6.2.1. Colour Palettes 41  
    6.2.2. Concept Development 42  
  6.3. Refined Design 44  
7.0. Final design 47  
8.0. Conclusion 57  
9.0. References 59  
10.0. Appendix 71