

## Sensational 1 Presentation

### Contact :

Majken Gilmartin –  
Sensational Street Soccer ApS

+45 4010 7099

[mmg@sensationalfootball.dk](mailto:mmg@sensationalfootball.dk)

[www.sensationalfootball.com](http://www.sensationalfootball.com)



# SENSATIONAL 1

# Mission Statement

A woman in a purple soccer jersey is captured in the middle of kicking a large white soccer ball. The ball is oversized and features a red star and the word "STRENGTHS" on its panels. She is on a grassy soccer field with other players and goalposts visible in the background under an overcast sky.

By changing the size of the football to fit women we believe we can create a faster, safer and more attractive game to play and watch.

# Goal



Our goal is to eliminate the size 5 footballs in women's football.

In addition to a higher quality of the game, we will prove that the use of a football designed especially for girls and women will be safer – reducing injuries, which at this time is several times the ratio as in the men's game.

**(we want faster play, longer stay)**

# SENSATIONAL NR.1

# Majken Gilmartin, Bettina Falk & Thomas Slosarich



## Majken Gilmartin

- Film producer for +10 years,
- Head of Sports at the municipality of Copenhagen
- Responsible for the IOC congress
- Producer of the Copenhagen Mayors Summit
- UEFA licensed Coach and Board member of football club B.93
- Founder of Sensational street soccer, Cph Moves and the sensational 1 football

## Bettina Falk

- Former player on the Danish national football team (56 matches).
- Sports Consultant in the municipality of Copenhagen
- UEFA licensed coach for girls under 18 years.
- Participant in the women leadership program in the Danish FA.
- Member of the Danish delegation in the European women leadership program, "ENTER".

## Thomas Slosarich

- Former player in the Danish Premiere League
- Former player on the Danish U18 national team
- Former Grassroots Manager at The Danish FA
- Member of UEFA Grassroots Working Group
- UEFA licensed coach.
- Youth Development Coach at the Danish FA



U18 player, Nina Meinicke, Bettina Falk & Majken Gilmartin



Majken Gilmartin, U18 player, Fatima Al-Afour & Thomas Slosarich

# SENSATIONAL NR.1

# Playing Field



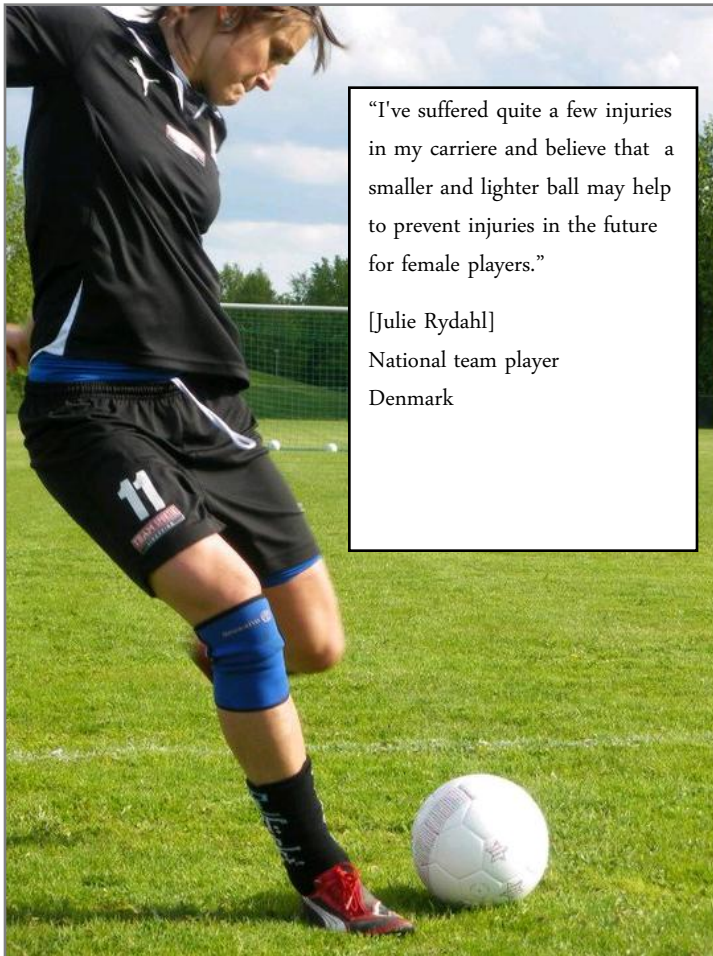
When the Danish FA in 2009 gave us permission to play with the *Sensational 1* in Denmark, they gave U18 girls and women players a chance to play a faster and safer game and the playing fields on which to do thorough testing of Sensational 1.

Since 2008 we have been testing Sensational 1 in games and in Laboratorys.

2011 The Danish FA gave permission to play with Sensational 1 in the Senior/adult Leagues.

**SENSATIONAL NR. 1**

# Facts



"I've suffered quite a few injuries in my career and believe that a smaller and lighter ball may help to prevent injuries in the future for female players."

[Julie Rydahl]  
National team player  
Denmark

*If a specific player is able to kick a standard size 5 ball 33 meters, then the same player can kick Sensational 1 37.4 meters (13% longer)*

*A 20-meter pass (not touching the ground) will take 0.91 seconds with a standard size 5 ball while the Sensational 1 ball would take 0.85 seconds (6% shorter).*

# SENSATIONAL NR.1

# The importance



- *National team player Cathrine Paaske "I certainly support the idea of a ball adapted to women players."*

*I am convinced that this can make women's football more attractive to look at, in the sense that women could make faster passes and longer kicks / passes using less power. I have personally tested the ball. I kicked significantly longer with sensational 1 than with an ordinary ball. I have also tested the ball in small sided games and was positively surprised that it was fast in a controlled way.*

**SENSATIONAL NR.1**

# Scientific Studies



As we wanted to make a lasting and sustainable change of the game, we teamed up leading scientists in the field of biomechanics and other relevant areas. Then we started the process of calculating and producing a football especially designed for women.



female soccer ball  
 with the aim of producing the highest possible ball speed. All subjects were elite and substitute soccer players; their age was 17-32 years and they practiced between 3 and 6 times per week. Each subject kicked each ball 5 times. Reflective markers were placed on the ball and on the kicking leg of the subjects (Figure 1). The three-dimensional positions of the markers were recorded at 500 frames per second. For each kick the speed of the foot and the ball was calculated and comparisons were made, between kicks with a standard ball and the new ball.

Tests  
 of the female soccer ball, Internis biomechanics, has been investigated at the Department of Sports Science at the University of Aarhus, Denmark. 35 females kicked a standard sized ball (Select BrilliantSuper) and the new female soccer ball (Sensational 1)

### Results

The results revealed that the ball speed was higher when kicking the new ball (23.9 m/s vs. 22.5 m/s). Furthermore there was no difference in the speed of the foot between kicks with the two balls. Figure 2 shows a graph where the group average ball speed is plotted for kicks with a standard ball and with the new female ball.

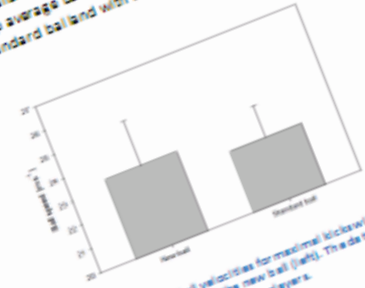


Figure 2. Average ball velocities for maximal kicks with a standard ball and the new ball (left). The data is collected from 35 female soccer players.

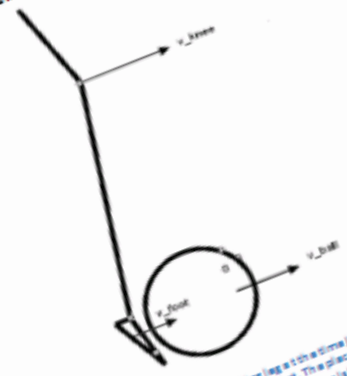


Figure 1. Model of the kicking leg at the time just before the ball is struck by the foot. The placement of the reflective markers on the ball and leg is indicated.  $v_{foot}$  is the foot speed before impact and  $v_{ball}$  is the ball speed after impact.

# The Scientists

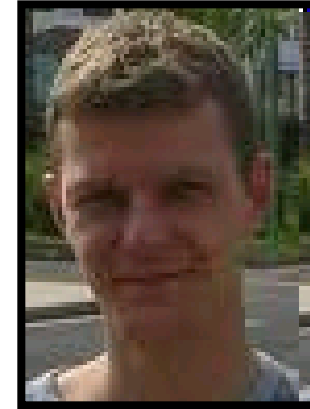


U18 players in the lab with coaches and scientists

**SENSATIONAL NR.1**

# Thomas Bull

- Thomas Bull Andersen is Associate Professor at the Department of Sport Science at the University of Aarhus.
- Over the past 10 years he has worked with the biomechanics of soccer kicking and has in this connection published more than 10 scientific articles on the subject. In the earliest work he derived an expression that describes the influence of foot velocity and mass on the ball velocity in soccer kicking.
- Part of this work provides the theoretical background for the development of the Sensational 1 ball.
- Besides working with soccer kicking Thomas has worked on topics as diverse as analysis of shot putting, testing shoes for Hummel and loads on the spine.
- At the Department of Sport Science, at the University of Aarhus, Thomas will perform numerous experiments with the Sensational 1 ball.



"Our study clearly shows that women can kick the new ball harder and that the passing game can be significantly faster."

[Researcher Thomas Bull ]

# SENSATIONAL NR. 1

# Peter Krustrup

## Educational background:

Master of Science in Exercise Physiology, University of Copenhagen, 1998.

PhD in Exercise Physiology, Dept. of Exercise and Sport Sciences, University of Copenhagen, 2004. Thesis title: "Muscle oxygen uptake and energy turnover during dynamic exercise in humans".

## Positions:

Vice head of Dept. of Exercise and Sport Sciences, University of Copenhagen, from 2007-2010.

Associate professor (2005-present) and assistant professor (2003-2005) at Dept. of Exercise and Sport Sciences, University of Copenhagen.

## Commitments and teaching duties:

Currently main advisor for 3 PhD students and co-advisor for 4 PhD students.

Teaching at multiple University Courses and PhD courses from 2003-present.

Organiser of an international congress in 2009.

Guest Editor for Scand J Med Sci Sport in "Football for Health" special issue in 2010.

## Publications:

75 peer-reviewed articles (40 as first or last author) from 2000-present.

80 abstracts published in relation to 29 scientific congresses held from 1997-present.

6 book chapters in English and 18 sports related articles in Danish or English football and sports magazines from 1996-present.

## Awards:

Unibanks "Idrætslederpris" in 1995.

"Young Investigators Poster Award", ECSS, 1997.

"Media Award", University of Copenhagen, 2007.

"Top 100 Health Professionals 2010", IBC, Cambridge, England, 2010.

"Who is Who in America – Medicine and Health Care", 2009 and 2010

"Men's Health Award" in June 2010.

## Sports related positions:

Guest editor with Jens Bangsbo and head of FIFAs Science dept. F-MARC; Jiri Dvorak

Fitness advisor for the Danish top-class referees from 1998-2001 and 2002-present.

Fitness advisor and educational advisor for the Danish Football Association (DBU) from 1996-present.

A-licence football coach with 12 years of experience.

## Funding:

Dk. 7.000.000.- from 2007-2010



# SENSATIONAL NR.1

# Mette Zebis

## Degrees

- 2002 Bachelor in Biology, University of Copenhagen  
2002 MSc in Exercise Physiology, University of Copenhagen  
2007 PhD, Faculty of Health Sciences, University of Copenhagen

## Current Position

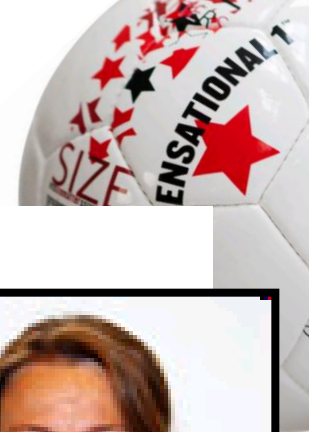
- Post Doctoral Fellow, Hvidovre Hospital and University of Southern Denmark

## Relevant Employments

- PhD Stud. at the Faculty of Health Sciences, University of Copenhagen
- Researcher, the Gait Analysis Laboratory, Hvidovre Hospital
- Post Doctoral Fellow, the National Research Centre for the Working Environment, Copenhagen
- Reviewer for International Journals
- European Journal of Applied Physiology
- Scandinavian Journal of Medicine and Science in Sports

## List of peer-reviewed articles

- [Protocol for Work place adjusted Intelligent physical exercise reducing Musculoskeletal pain in Shoulder and neck \(VIMS\): a cluster randomized controlled trial.](#)  
Andersen LL, Zebis MK, Pedersen MT, Roessler KK, Andersen CH, Pedersen MM, Fevele H, Mortensen OS, Sjøgaard G. BMC Musculoskelet Disord. 2010 Aug 5;11:173.
- [Acute fatigue impairs neuromuscular activity of anterior cruciate ligament-agonist muscles in female team handball players.](#)  
Zebis MK, Bencke J, Andersen LL, Alkjær T, Suetta C, Mortensen P, Kjær M, Aagaard P. Scand J Med Sci Sports. 2010 May 24.
- [Muscle activation and perceived loading during rehabilitation exercises: comparison of dumbbells and elastic resistance.](#)  
Andersen LL, Andersen CH, Mortensen OS, Poulsen OM, Bjørnlund IB, Zebis MK. Phys Ther. 2010 Apr;90(4):538-49.
- [Game-induced fatigue patterns in elite female soccer.](#)  
Krustrup P, Zebis M, Jensen JM, Mohr M. J Strength Cond Res. 2010 Feb;24(2):437-41.
- [Early and late rate of force development: differential adaptive responses to resistance training?](#)  
Andersen LL, Andersen JL, Zebis MK, Aagaard P. Scand J Med Sci Sports. 2010 Feb;20(1):e162-9.
- [Identification of athletes at future risk of anterior cruciate ligament ruptures by neuromuscular screening.](#)  
Zebis MK, Andersen LL, Bencke J, Kjær M, Aagaard P. Am J Sports Med. 2009 Oct;37(10):1967-73.
- [Effect of physical training on function of chronically painful muscles: a randomized controlled trial.](#)  
Andersen LL, Andersen CH, Zebis MK, Nielsen PK, Søgaard K, Sjøgaard G. J Appl Physiol. 2008 Dec;105(6):1796-801.
- [The effects of neuromuscular training on knee joint motor control during sidcutting in female elite soccer and handball players.](#)  
Zebis MK, Bencke J, Andersen LL, Døssing S, Alkjær T, Magnusson SP, Kjær M, Aagaard P. Clin J Sport Med. 2008 Jul;18(4):329-37.
- [Selective activation of neuromuscular compartments within the human trapezius muscle.](#)  
Holtermann A, Roelvelk K, Mork PJ, Grönlund C, Karlsson JS, Andersen LL, Olsen HB, Zebis MK, Sjøgaard G, Søgaard K. J Electromyogr Kinesiol. 2009 Oct;19(5):896-902.
- [Muscle activation during selected strength exercises in women with chronic neck muscle pain.](#)  
Andersen LL, Kjær M, Andersen CH, Hansen PB, Zebis MK, Hansen K, Sjøgaard G. Phys Ther. 2008 Jun;88(6):703-11.
- [Foot medial longitudinal-arch deformation during quiet standing and gait in subjects with medial tibial stress syndrome.](#)  
Bandholm T, Boysen L, Haugaard S, Zebis MK, Bencke J. J Foot Ankle Surg. 2008 Mar-Apr;47(2):89-95.
- [The effect of resistance training combined with timed ingestion of protein on muscle fiber size and muscle strength.](#)



# New football for women



Content:

1. Biomechanics of Male vs. Female kicking
2. Results & Conclusion



**SENSATIONAL NR.1**

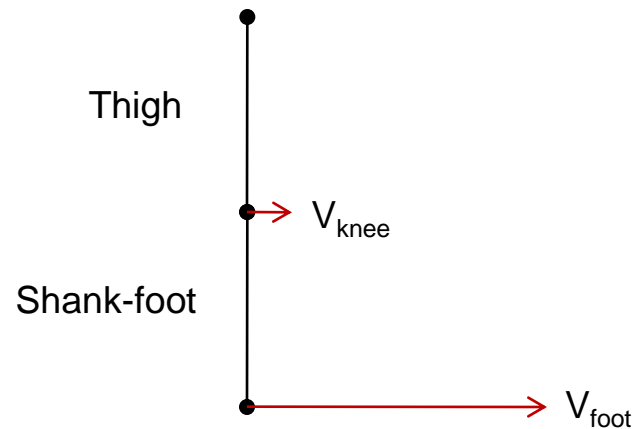
# 1. Male vs. Female kicking

Consider

a man and a woman kicking a standard ball with the same foot velocity:

Only the mass and height of the players are different

Theoretically, the male ball velocity will be 5% higher.



**SENSATIONAL NR.1**

# 1. Male vs. Female kicking

Consider

- a man kicking a standard ball and
- a woman kicking the new women's football with the same foot velocity:

Only the mass and height of the players are different

Theoretically, the male and female ball velocity will be equal.

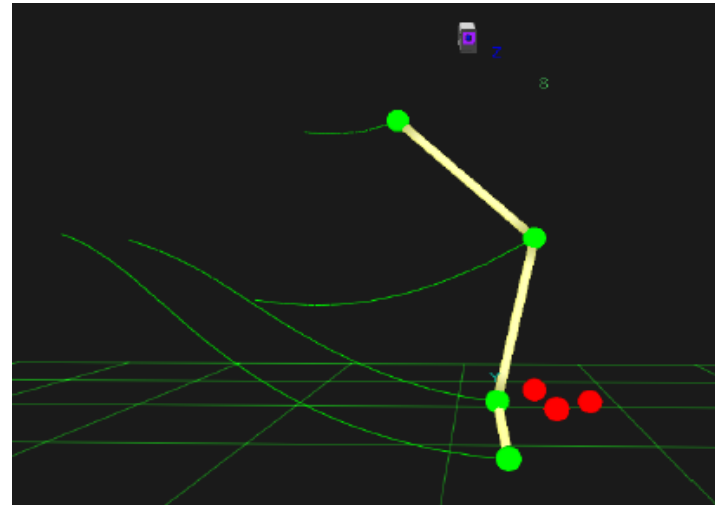


**SENSATIONAL NR.1**

## 2. Results

Main result:

With the new women's football, elite women kick the ball with 4% higher ball velocity.



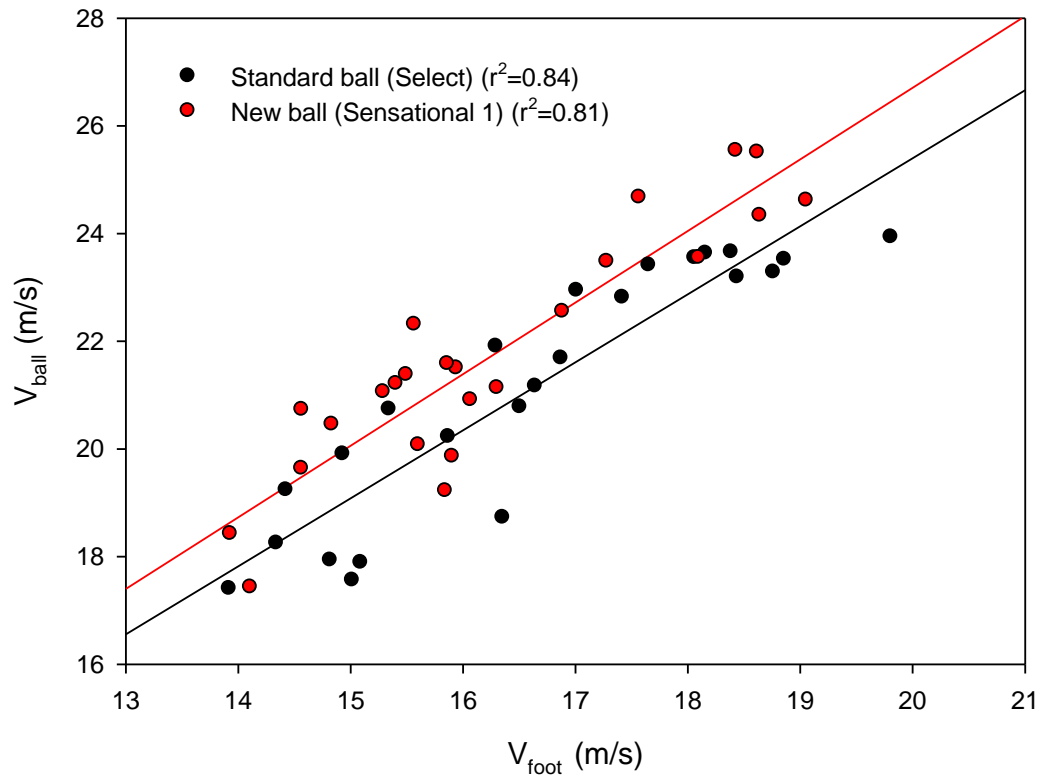
Screenshot from a recorded kicking motion. The green markers were placed on the kicking leg of the subject and the red markers on the ball. The motion was recorded at a frame rate of 500 Hz.



# SENSATIONAL NR. 1

## 2. Results

The figure shows data from 8 female elite subjects. From the graph it can be seen that for a given foot velocity, the ball velocity is higher when kicking the football for women (red line)

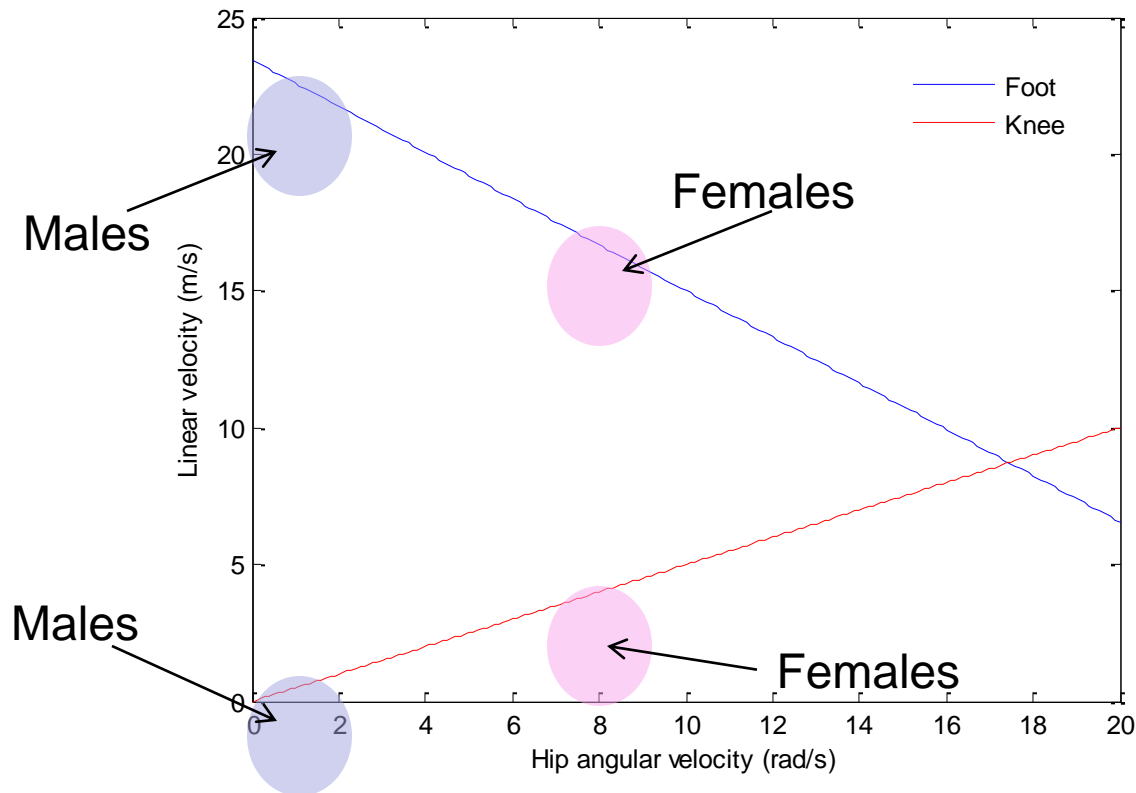


**SENSATIONAL NR.1**

## 2. Results

Data from elite football players. It can be seen that female kickers tend to move both the thigh and the shank towards the ball whereas the male kickers only rotate their shank (the velocity of the knee is close to zero). Changing the movement will remove the pressure on the female knee close to zero.

These results have led to another series of experiments to investigate if female kicking can be altered by using the new ball.



# Background

## Background

Elite male football players achieve maximal ball speeds of approximately 30 m/s when kicking under laboratory conditions. Female players, however, only achieve speeds of up to 22 m/s.

This phenomenon possibly influences female match play; it is more difficult for women to make long passes, to pass the ball quickly between players and to score goals from a long distance.

In others sports, such as basketball and European team handball, the size and weight of female balls are smaller. The basis for this is that the passing and scoring possibilities of players are influenced by the size and weight of the balls.

Accordingly, a theoretical investigation was made, in order to describe a new female football that will enable the players to kick harder.



**SENSATIONAL NR. 1**

# Testing

The behavior of the Sensational 1 football, in terms of kicking mechanics, has been investigated

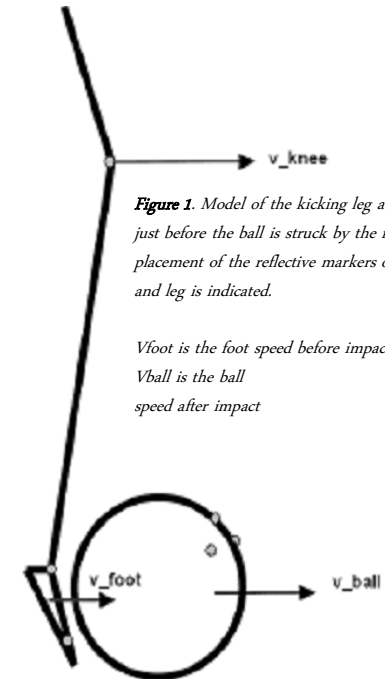
35 females kicked both a standard sized ball (Select Brilliant Super) and the new women's football with the aim of producing the highest possible ball speed.

All subjects were elite and sub-elite football players; their age was 17-32 years and they practiced between 3 and 6 times per week.

Each subject kicked each ball 5 times. Reflective markers were placed on the ball and on the kicking leg of the subjects

(Figure 1).

The three-dimensional positions of the markers were recorded at 500 frames per second. For each kick the speed of the foot and the ball was calculated and comparisons were made, between kicks with a standard ball and the new ball.



**Figure 1.** Model of the kicking leg at the time just before the ball is struck by the foot. The placement of the reflective markers on the ball and leg is indicated.

$V_{foot}$  is the foot speed before impact and  $V_{ball}$  is the ball speed after impact

# SENSATIONAL NR.1

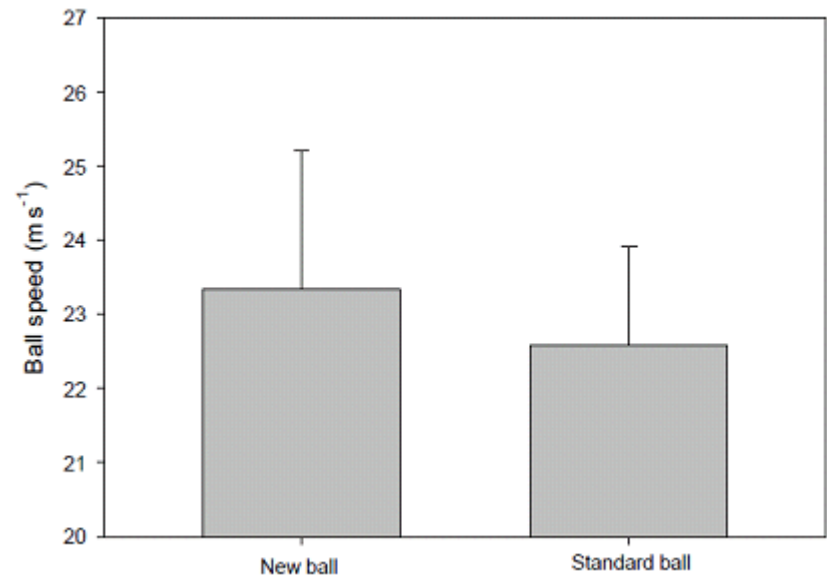
# Results



The results revealed that the ball speed was higher when kicking the new ball (23.9 m/s vs. 22.5 m/s).

Furthermore, there was no difference in the speed of the foot between kicks with the two balls.

Figure 2 shows a graph where the group average ball speed is plotted for kicks with a standard ball and with the Sensational 1 ball.



*Figure 2. Average ball velocities for maximal kicks with a standard ball (right) and the new ball (left). The data is collected from 35 female football players.*

# SENSATIONAL NR.1

# Other sports

with gender-specific adaptations:

	Women	Men
Handball	325-375 g. 54-56 cm circumference	425-475 g. 58-60 cm circumference
Basketball	510-567g. 72,4-73,7 cm circumference	567-650 g. 74,9-78 cm circumference
Athletics – Hedge	84 cm	106,7 cm
Athletics– Shot Putting/Hammer Throw	4 kg	7,26 kg
Athletics - Javelin	600 g	800 g

In football, as size 5 ball (410-450 g. 68-70 cm circumference) is used for girls and boys from 12-15 years and upwards.

**Sensational 1, 360 g and 67 cm circumference**



# SENSATIONAL NR.1



# Work in progress



With our 2009-10 tests done on 10 u18 teams There were more than 50 % higher wear & tear injuries among players using the standard 5 ball. Most injuries happen in the last part of the game where players are tired. Using size 5 players spent most of the time with 95 % of HRmax and less relative time in 80-90% of HRmax. These numbers shows that there are too much time played in high Hrmax making players vulnerable to injuries. Best case with the teams playing with sensational 1. No knee injuries.. Worst case with test team that played with standard size 5. 6 ACL tears and 2 waiting for operation out of a team of 22 players age 16/17.

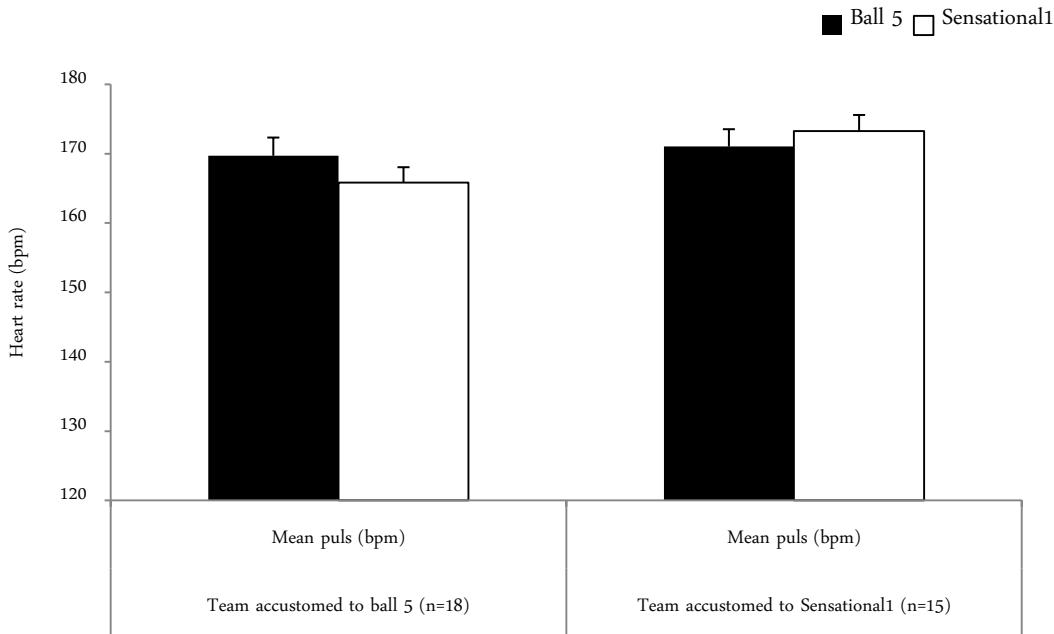
The financial grants from Nordea Foundation and The Danish FA give us the Opportunity to test on 3000 elite players, age 15-19, from 110 Danish soccer clubs, to get as strong results as possible in identifying how the ball's size affects her injury pattern and injury frequencies.

We are now doing

- video entries
- GPS analysis
- Pulse measurements
- Advanced technical and tactical analysis and surveys of 3000 players

# SENSATIONAL NR.1

## Mean heart rate U18 female soccer



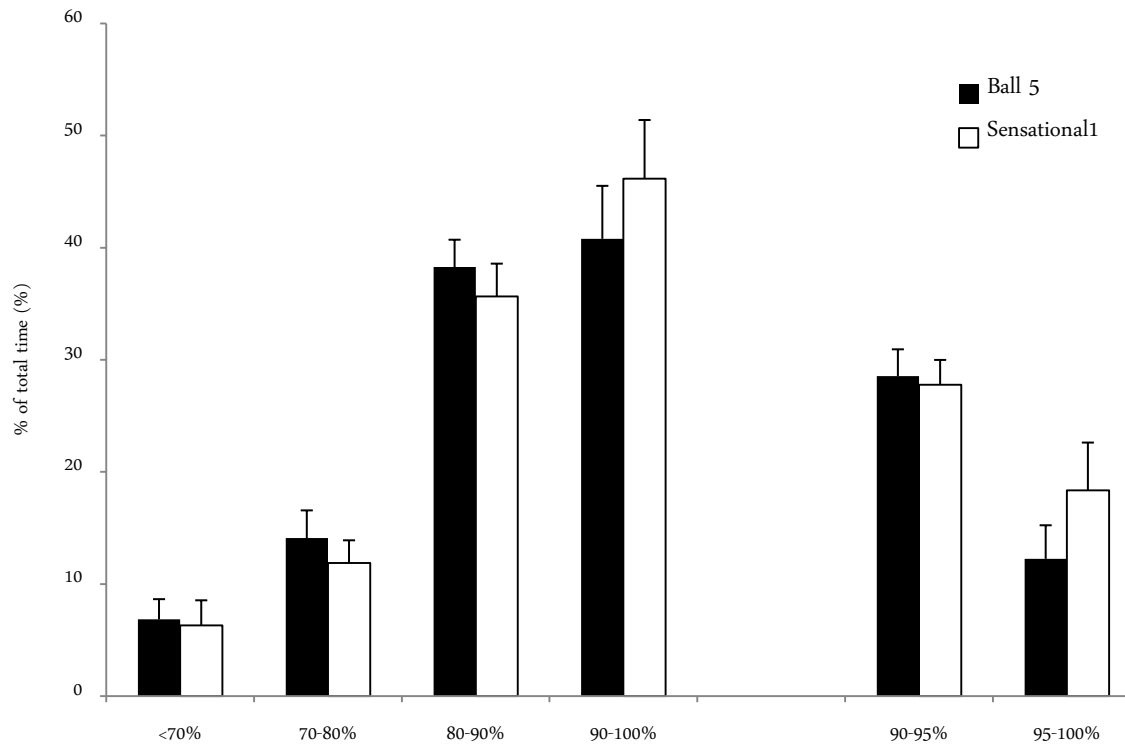
No major differences ( $P > 0,05$ ) in mean heart rate for U18 female players accustomed to either ball 5 or Sensational1 .

*So even as the speed of the ball and the game is increased, the heart rates of the players are not increased and they are therefore not subjected to a higher level of stress.*

# SENSATIONAL NR.1

## Heart rate distribution during U-18 Female soccer

Team accustomed to ball Sensational1 (n=13)



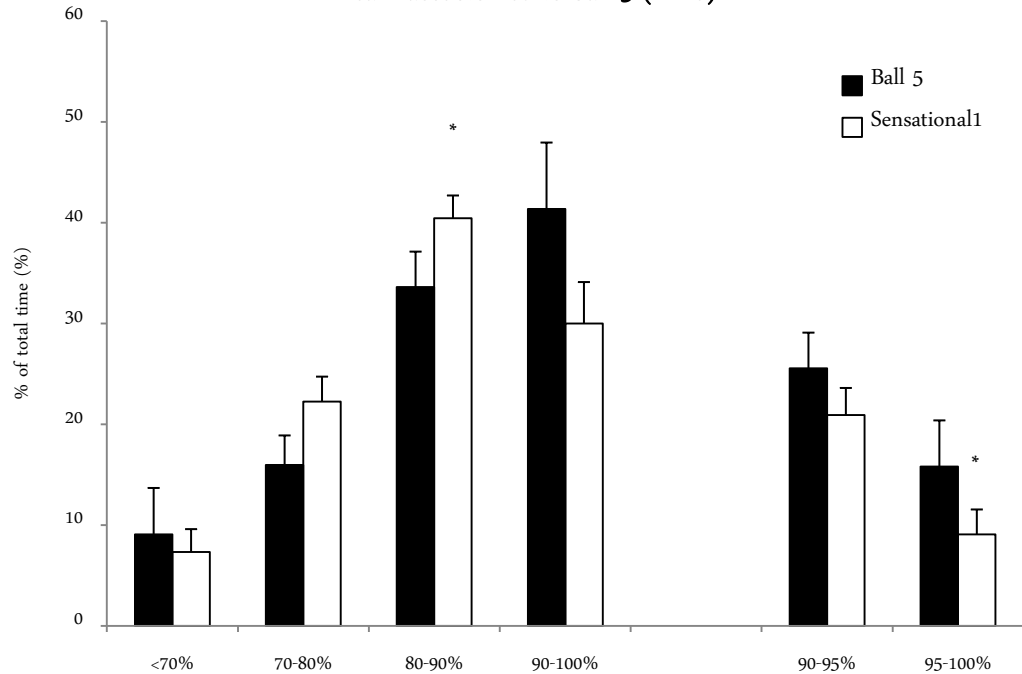
No differences in heart rate distribution for players accustomed to the Sensational1 ball

*The physical burden on the players are not increased even though the speed is increased*

# SENSATIONAL NR.1

## Heart rate distribution during U-18 Female soccer

Team accustomed to ball 5 (n=10)



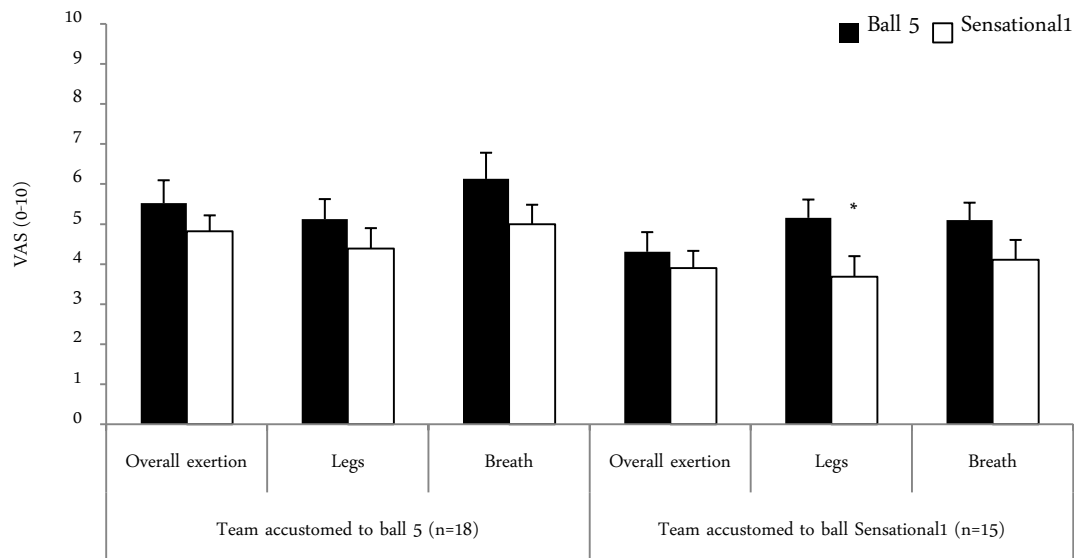
Players unaccustomed to Sensational1 ball spent more relative time over 95 % of HRmax and less relative time in 80-90% of HRmax, when playing with a standard ball 5

*Will the increased speed using the Sensational 1 ball combined with a lower pulse rate provide the female players with the capabilities to keep a higher intensity for the full length of the game?*

*The study indicate, that it is more physical demanding playing a game with a size 5 ball.*

# SENSATIONAL NR.1

### Perceived exertion during U-18 Female soccer



The strain of the legs was reported to be higher (5.2 vs 3.7) when playing with a standard ball 5.

# SENSATIONAL NR.1

# Ongoing Testing



At this point we have a constructive dialogue with The Danish FA, The Scottish FA, The Swedish FA and The German FA.

Currently we are testing and playing with the the ball in:

## **Denmark**

U18 and women's tournament under The Danish FA

## **Germany,**

U-18 girl's tournament in the Hessen FA and

Landau University

## **Scotland**

Glasgow Celtic women's team

## **USA**

Westchester Youth Soccer League



With our endless talks with players and coaches, we sense that the world of women's football is ready for a change to a more suitable ball – especially designed and adjusted - just like handball, basketball, athletics have done for years with great success.

# SENSATIONAL NR. 1

# CSR — Giving girls an equal playing field



A basic principle guiding participation in sports should be that of 'equal opportunities for everyone involved in the game'. Performing on level playing fields where intertwining elements illuminating the importance of 'physical safety' for participants is a guiding force, should be what characterizes social responsible sports.

This is aligned with the need for good governance procedures from sports governing bodies surrounding women's football - from recreational leisure time activities to formal club football and the overlying governing bodies at local, regional, national and global levels.

'Sensational 1' is a new ball taking women's football in the right direction in a sport that has come to a new crossroad regarding the need for transparency in terms of social responsible actions - those related to women's football. It is time to level the playing field for women so that they find themselves in a game of increased speed and safety.

# SENSATIONAL NR.1

# CSR

As a former player and a mother it was not difficult to let my daughter play football. I do believe that it's a brilliant sport for girls. But not paying attention to the huge amount of injuries among female players was not an option.

So out of desperation and the fact that these girls are our future, we kept the size 5 football away from our girls and started working on Sensational 1 - looking for Faster play, Longer stay.

We believe, that this is a ball designed to fit and meet the needs of 15+girls and women playing the game and to provide them with an Equal and safe opportunity to have a lifetime of joy playing the game they love.



*Size 5! Systemic Failure?*

# SENSATIONAL NR.1

# CSR — Giving girls an equal playing field

## Global tendencies:

The focus on staying healthy, for your own sake and for the better of society. Don't burden the healthcare system - we are all responsible for not wasting scarce resources.

We all have to make 'responsible decisions'.

## Events

Together with companies Cover fashion magazine, Hummel, Gajol, Momondo, MetroXpress, Roskilde Music Festival and The City of Copenhagen, we have held Sensational Street Soccer Tournaments [www.cphmoves.dk](http://www.cphmoves.dk) More than 2000 women played this year- using the Sensational ball – showing that team sport is healthy and fun (one of the healthiest sports “Krustrup et al. 2010a-d; F-MARC supported Football for Health supplementum in SJMSS).



# SENSATIONAL NR.1