

Underrepresented Identities: A Study of the Black Female Track Athlete

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### **Abstract**

Women of color are some of the toughest athletes to face sports. Not just through their physical capabilities but also their psychological capabilities. How black, female track athletes are viewed are less about performance and more about their physical looks from uniform to hair and nails and how their bodies look. This unfortunately begins at a very young age, starting as early as late middle school and increases the most in high school. This also includes different stigmas, assumptions and personal opinions about what these athletes are capable of and being questioned with performance enhancing drugs as these athletes grow into their collegiate-elite careers. The black female track athlete body is often compared to that of a man. This research will explore a new way to look at track uniforms at the high school level, where a lot of these issues begin, and seen for their abilities in a space that is judge free and encourages all forms of athlete expression.

### Definitions & Understanding

Certain terms and phrases will be used throughout this paper that are important to know when discussing certain issues within the Black community and other groups. It is important to become familiar with these words in order to educate ourselves on issues that may not fit our own everyday lives.

- ***African-American:*** (nation specific) typically talking about black people born within the United States
- ***Black:*** used interchangeably with African-American but refers to black people on any continent

\*Note: if you're unsure use Black and default to African-American if you're corrected

- ***Hypersexualization:*** an extended sense of making something sexual in character or quality, also linked to sexual objectification
- ***'Mammy' (Mammie) stereotype:*** A U.S. historical stereotype, originating from the south, depicting black women who work in a white family and nurse the family's children; a fictionalized character often visualized as a larger-sized, dark-skinned woman
- ***Masculinized:*** induce male physiological characteristics in; cause to appear or seem masculine
- ***Policing (in terms of women & their bodies/clothing):*** the act of limiting and penalizing women for the clothes they wear on specific body shapes/sizes
- ***Transgender:*** individuals that have a gender identity or gender expression that differs from the sex that they were assigned at birth.
- ***"Jezebel":*** a stereotype dating back to slavery that frames black women as hypersexual predators looking to corrupt men

### Fighting Identities: A Study of the Black Female Track Athlete

Dress code standards for women athletes has been a long, ongoing debate for what is “appropriate” and what is not. Katie Sveinson, an assistant professor in the school of Sport, Tourism, and Hospitality Management at Temple University puts it this way, “It’s really a policing of certain bodies” (Norwood, 2021). Black, female athletes are in a constant battle for self-identity and their identities as athletes. There have been many times we have seen these athletes face ridicule for putting mental health and their needs before the game, hypersexualized, seen more for than physical appearance than athletic performance, being portrayed as ‘angry’ or rather aggressive and so many more stereotypes. In addition to this, Black female athletes begin to experience certain things from an early age that include, but are not limited to: discrimination, racism, sexism, colorism, etc. This research will take a deeper dive into the psychological health of Black, young female track runners and how different stylized designs of color and silhouette and fit/comfort technologies can empower them.

#### **Female Sexualization Black History**

Historically, black women’s bodies have been hypersexualized for years. Sarah Baartman (known as the original ‘mammie’) is seen as the epitome of colonial exploitation and racism (Parkinson, 2016). She died two centuries ago after spending years in European “freak shows”. She was placed on display as being known for her large buttocks and afro-centric features.



*Figure 1 Sara Baartman Engraving*

Beyond that time, women of color have been sexualized, objectified and discriminated against for their body features that eventually found its way into sports. The historical institution of slavery, current stereotypes and sexuality are factors that impact the objectification of black women's bodies (Anderson, 2018). The biases of young black girls can begin as early as the age of 5 years old (Georgetown Law, 2017). Black girls have been and continue to be held at a different standard in beauty, education, sport and so on. Even compared to the white girl/woman, Black girls experience ten times the prejudices to their white counterparts. Black girls are also subjected to the sexualization that is deeply rooted in slavery to the 'jezebel' stereotype, which suggests that Black girls/women are seeking male attention or "fast" with the clothing they wear given their body types (Lockhart, 2019). This stereotype that views Black girls/women as promiscuous and sexually predatory is why they are robbed of their innocence as a child. Their innocence is turned into a sex symbol and carries on throughout their lives.

### **The Black Female Body**

Black girls/women fall short when it comes to the way their bodies are measured behind Eurocentric ideals. The body composition of a Black women has met highly skewed results in BMI metrics that make it more difficult to assess proper health metrics for these women in sports medicine. “Body mass index (BMI) is an estimate of body fat. It’s calculated using a statistical ratio of weight to height and applied based on your sex assigned at birth” (Alexis, 2021). The problem is that the BMI metric misclassifies rates of overweightness and obesity in historically marginalized ethnic populations, and more particularly, Black women (Alexis, 2021). The BMI metric was created centered around the white male and female body. What this metric cannot measure is body composition- % of fat to % of lean mass (muscle). “Generally, non-Hispanic Black men and women have lower body fat percentages and higher muscle mass compared with non-Hispanic white people and Mexican Americans” (Alexis, 2021). A study done by Peter Katzmarzyk and others at the Pennington Biomedical Research Center in Baton Rouge, Louisiana examined white and African American women. It was theorized that the weight gap between white and Black women has to do with how body fat is distributed differently throughout the body and how “belly fat” has more health risks than of fat in the hips and thighs (Lowen, 2019).

Different research studies done on pubertal transition amongst different raced girls, it was shown that on average African American girls tend to reach puberty at an earlier age than their peers from other racial groups (Herman-Giddens et al., 1997; Rosenfield et al., 2000; Talpade, 2006; Talpade, 2008). Not only are these girls experiencing puberty at an earlier rate with their body changes, weight gain, hormonal changes, etc., they are also forced to be introduced to societal sexualization sooner (Brown, Halpern, & L’Engle, 2005; Roberts, 2013).

### **Sexualization of Female Athletes**

Female athletes do not have the same luxury as male athletes of being portrayed simply for their performance. Their ‘beauty’, body and sex appeal overshadows any skill they have when it comes to the media (Liang, 2011). These women are seen as just a woman first and her performance abilities as an afterthought.

As children, Black girls are taught to be mindful of the clothing worn around certain areas, groups of people, etc. that carries on into adulthood of still keeping these practices in mind in order to protect ourselves. Black women are conscious of this in everyday tasks, the professional workplace, in sport and so on because of the different perceptions of the attention our bodies bring unsolicited. The media is the biggest factor driving these stereotypes around Black girls/ women. Black girls/ women are increasingly objectified and demoralized that has a large effect on their mental health (Moses, 2020).

In a raw interview with Allyson Felix, she says herself “I definitely would love to see women not be sexualized. I get that that works, but it would be great if we could move away from that...I want what I do on the track to be enough.” She also stated how the standards for women surpasses that of men because it is larger than numbers, records, and medals. The success of a women athlete stands in their beauty, how marketable are they, is their natural hair what a company wants to see? The weight of all these things are begun to be seen at the high school level to determine whether or not an athlete wants to even continue on into their collegiate and/or elite levels with all of this in mind to hold in addition to their actual performance.

### **Athlete Discrimination**

Female athletes have been handed the short end of the stick for many years from having to play in poorer facilities, stricter dress codes, being ignored for many things that also includes



injury and also being portrayed as masculine or homosexual (Liang, 2011). Despite efforts to make a change for female athletes, this is still a reality for women of color. Caster Semenya, Christine Mboma, and Beatrice Masilingi are all examples of discrimination against black female athletes with natural born skill being seen as a threat. These three women were banned from the Olympics due to a naturally (biological) high level of testosterone for women. None of these athletes were taking performance enhancing drugs and were still targeted for something they naturally produce. “They were banned because they were born with something they’d have to take drugs to change” (Monclou, 2021). Serena Williams is another example of discrimination and racist attacks on black, female athletes. In 2018, a cartoonist for the Australian tabloid released a drawing of Serena at the US Open where she was portrayed as being irate, inconsolable, and violent (Monclou, 2021). As the number one woman athlete as decorated by wins and awards she is, Serena has been targeted for years by people removing her womanhood. She has been constantly masculinized due to her physical appearance as an athlete and not fitting into the Eurocentric ideal of what a female athlete should look and behave like. These examples are only a couple of many and more that people are not even aware of because they don’t make the media. It’s examples like this that keep girls of color from playing sports or continuing to play sports as they get older and have a better understanding of the world and its standards.

### **Struggles of High School Girl Athletes**

According to a study done in 2017 by the Women’s Sports Foundation, girls drop out of sports at 1.5 x the rate that boys do by age 14...then by age 17, more than half of girls will quit sports altogether (Bringas, 2021). The statistics in this include not seeing a future for themselves in this sport, believing they were not good enough, missing out on social life and balancing

academics. Along with sports, it is a constant battle to juggle a personal life, academics and mental health.

The inability to see a future in their sports connects a lot to poor, or even nonexistent funding and media coverage of women's sports (Bringas, 2021). Other factors that play a role in this struggle can also come down to the coaching of these girls and lack of support they are feeling.

### **Product History**

Track uniforms have gone through an evolution of material changes as innovation continues to take over this space. Before nylon was introduced, cotton dominated towards the end of the 29<sup>th</sup> century in sports products. For runners, it was breathable and lightweight. However, cotton on its own holds a lot of sweat without wicking it away from the runner, leaving them soaked by the end of one race (Brandom, 2012). Nylon was first developed by DuPont in 1935 (Hill, 2015). It did not make its debut into the Olympics until 1948 in bathing suits and later used in many different sports uniforms, including track. Polyester appeared in apparel during the 60s and 70s. It was first developed again by DuPont in 1951. Performance polyester was not developed until the 1990s and appeared in the US Olympic uniforms in 1996 as Dri-Fit (Ministry of Supply, 2021).

Computer modeling brought a new science to material innovation. Nike Swift uniforms first debuted in 2000 in the Sydney Games with the original Nike Swift suit, research on the material dating back as far as 1996 (Nike News, 2016). Ever since, the technology continues to evolve year by year.

### **The Athlete**

The intended target audience are high school black, female, athletes that run the 100m, 200m, 400m, middle/long distance, hurdles & relays nationwide. The girls must be a junior or senior in high school with the intention of continuing their track & field career at the collegiate level. These girls are at a pivotal time in their lives with all the changes they are going through not only in their education, but in their bodies. Puberty in girls can start at the early age of 12 years old up until 18 years of age. The body is continuously going through many changes that include, but are not limited to: fluctuating weight, breast size increase, growth spurts, producing more sweat, bloating and body shape changes in the waist, hips and thighs (John Hopkins Medicine). The goal is to target these girls of various changing body types from slim to androgynous for accurate results in the effectiveness of produced technologies. Between 2018 and 2019, there were 488,267 high school girls that participated in U.S. high school track and field (Lange, 2021). The amount of women for this line to serve overall is approximately 300,000 girls.

### **Physiological and Psychological Needs**

For women of color that are athletes, their physiological makeup most times is seen as a threat in competition because of their superiority. Their physical prowess, hyper-athletic, masculinized and or/ 'animalistic' bodies is often racialized descriptions that debase black women's bodies (Giddings, 2017). However, the makeup of the black female body is better described through simple genetics and not made-up theories that these women are 'superheroes' with unexplainable abilities. When designing for black women, different factors need to be taken into account that currently follow Eurocentric ideals when designing uniforms. These factors include: body shape (curves vs. muscle) muscle sizes, bust sizes and shoulder width spans. Since

most uniforms are designed based upon Eurocentric principals, the body composition of black women compared to white women differs, as well as the resting metabolic rate being lower in black women compared to white women (Jones, 2004).

Florence Griffith-Joyner ('Flo-Jo') is a well-known icon in the track world for a numerous amount of accolades and being coined as the 'fastest woman in the world'. She brought individuality to the sport that has traveled down generations to athletes in track and field such as Sha'Carri Richardson, and other black women in sports like Serena Williams, through her iconic looks of 6 in finger nails, long-flowing hair, one-legged suits and more.

In an interview with Flo Jo, she shares her perspective on why she designed her uniforms for herself the way that she did. She says, "you have to feel good in order to perform good... people have given me different outfits to try on and if they don't feel good, I don't feel confident wearing it" (Flo Jo). Flo Jo was an athlete that embraced her individuality and personal style through her athletic performance. She embraced her femininity in a way that made her feel good to perform how she knew she could, so it was not for the masses but for herself.

Despite her accolades and accomplishments, while she was alive even in her passing people choose to question and discredit her abilities with allegations of doping, despite her never testing positive for any kind of drug and was subjected according to the chair of International Olympic Committee's Medical Commission (Elan, 2021). This isn't the first encounter women athlete's abilities were questioned because their performance seemed unexplainable. Press media and now even social media, that makes news stories more accessible than they used to be stream many false headlines and accusations amongst these athletes the public comment on day in and day out. Earlier this year during the Tokyo Olympics, track runners Christine Mboma and Beatrice Masilingi were both barred from competing in the 400m event due to a 'too-high' natural

testosterone level according to World Athletics' track and field rules (Adom-Aboagye 2021). As the rules stand, unless these athletes agree to medically and artificially lower their testosterone through medication or surgery, they are ineligible to compete (World Athletics). These athletes are expected to take drugs/medication to artificially change their natural genetic make-up in a sport where drugs are looked down upon, especially in black athletes.

On the other side to Flo Jo being an athlete and embrace your femininity through her uniforms, some women in the sport do not have that luxury due to other bodies are viewed. Christina Epps represented team USA in the 2016 real Olympics and although a great accomplishment was experiencing racism sexist behavior because people thought she was not feminine enough. Black women's athletic abilities are undervalued based upon their looks (Fominykh, 2018). Epps explains how she felt pressures to change your appearance just to try and get sponsorships, which isn't uncommon for athletes that fall into this category of having a 'mannish' appearance (Fominykh, 2018). These examples are the few of many issues black, female athletes most specifically track athletes face in their sport that takes a toll on their mental health, their confidence and view of themselves as a female despite their accolades (Chaves, 2021). Unfortunately, high school athletes are subjected to similar issues of discrimination, racism, sexism, colorism and so on that they carry on into their collegiate or elite careers.

### **Athlete Position and Skills**

The target athlete position for this project includes black women, runners. The three races include the sprints in distance variations. The hurdles and relays. Starting blocks are used for all hurdle, relay, and sprint events. The starting commands are to be listened to by the athlete to set in their position and wait for the starter's gun to fire off to officially start the race. For the 100m, 100m hurdles, all competitors are to be lined up side-by-side. For the 200m, 400m and 400m

hurdles that involves curves, runners are to be staggered. Runners must remain in their pre-assigned lanes. The first athlete whose torso (as distinguished from the head, neck, arms, legs, hands, or feet) reaches the vertical plane of the closest edge of the finish line is the winner (NBC Olympics, 2021).

### **User Profile and Jobs to be Done**

For the purpose of this project, research will be conducted to essentially solve the different challenges women of color faces in sports uniforms historically designed for using Eurocentric ideals of a woman's body that is not the same for black women because of body/muscle shape differences and to have a uniform that "grows" with the user as they are experiencing many different body changes at once.

The user includes Black, high school girls. The jobs to be done in this new collection of uniforms is to serve a better fit and comfort for the athlete at this level that is experiencing many body changes during this time in their lives. The N.T.2.S (No Time 2 Spare Collection) is seeking for better custom adjustability for the athlete that does not include the use of a drawstring, additional support for the breast and back of the athlete through engineered knit compression zones, support also in major muscle groups the most power is coming from in the legs to keep them closer to the body while also providing recovery benefits. Other features include: the use of color theory for the empowerment and confidence in these young women while wearing the uniform, seamless warp knitted garment to reduce rising and chafing, and period protection for possible leaking.

### **The Environment & Product Rules**

The Florence Invitational is an event "For Every Flo Jo". All forms of expression through uniforms, hair, nails, etc. are accepted and encouraged to make the athlete feel free to be who they are as an athlete and just as a person. There is no limit to the creativity on how the athlete

chooses to wear their uniform and accessorize. It will run as a 2-3-day event where the athletes will be able to train with one another, perform in the uniforms provided by MINUS and have scouting opportunities during the event. The invitational is to be held in Indianapolis at the Michael A. Carroll Track and Soccer Stadium, where Flo Jo set her 100m Olympic world record in 1988 with a time of 10.49 seconds. It is to be held during the summer time in June. Average day time temperatures during this time of year in Indianapolis can range from 73 degrees Fahrenheit to 81 degrees Fahrenheit (Climate-Data, 2021). The Michael A. Carroll Stadium is an 8 lane track with a Mondo running surface (IUPUI, 2021). Red is the most commonly used color for athletic running tracks as it is the most UV stable. This means the track color will not fade or react to sunlight as much as other tracks, so it stays at a higher standard for longer (Trade Partners, 2017). The new uniforms will be designed to make the athlete stand out against the track, while serving the purposes of empowerment and strength.

### **Product Classification**

How this research will be delivered will be in the form of different kits used by trackrunners. The execution will be done through figuring out the athletes' favorite type of silhouettes for uniforms. The uniform kits will work as a system as the tops and bottoms are interchangeable. In total, the line will include two different tops and two different bottoms.

### **Relevant Competitors**

Nike supplies the best competitor products for runners in track and field. How they will be analyzed can be done by pieces. These pieces include: unitards, run form tank, run short, run legging, run brief and long sleeve top. For high school girls, the most common type of uniform includes: run form tank, run form short, loose singlet and loose run short. However, at the high school level, uniforms provided are solely dependent on what the program can afford. In 2020,

Squad Locker, a brand that offers top brands at affordable prices with the option of customization as well for the individual schools, provided their top picks of uniform choices for schools to choose from. The following is provided by Squad Locker, 2020.

### **Overspeed Kit- Augusta Sportswear Brands**

1. Jersey made of 100% polyester knit assures comfort and moisture wicking benefits
2. Contrasting inserts and specialized technology that holds decoration
3. Comfortable shorts with covered elastic waistband, inside draw cord, matching elastic inner brief and side vents
4. 10 different colors
5. Price starting at \$32.95

### **Team 19 Kit- Adidas**

1. Jersey made of 100% recycled polyester
2. Interlock body and side panels with engineered mesh back panel and forward front shoulders
3. Shorts have recycled engineered mesh upper side panels and elastic tape waistband with inner brief and no draw cord
4. 10 different colors
5. Price starting at \$47.95

### **Kick Kit- Under Armour**

1. Jersey incorporates UA's proprietary moisture-wicking system for breathability and comfort, styled with back stretch mesh and athletic color blocking on front and back
2. Shorts are ultra-light with internal moisture-wicking liner
3. Men's and women's
4. 8 colors
5. Starting at \$49.95



**Stride Kit-Badger**

1. Jersey is made of moisture-wicking, antimicrobial performance fabric, with double-needle hem and sleek contrasting side inserts
2. Shorts have covered elastic waistband with draw cord and an inner brief with elastic leg
3. Men's, women's and youth sizes
4. 9 colors
5. Starting at \$28.95

**Accelerate Kit- Augusta Sportswear Brands**

1. Jersey is designed with sporty asymmetrical color contrast yoke and ensures comfort with tag less label and moisture-wicking poly knit fabric
2. Shorts have side vents, covered elastic waistband with draw cord and a matching inner brief with elastic leg
3. Men's, women's and youth sizes
4. 10 colors
5. Price starting at \$31.95

**Showtime Kit-Under Armour**

1. Customizable jersey in UA's signature HeatGear® fabric that is lightweight and provides 4-way stretch
2. Shorts in sublimated woven fabric are ultra-light and have an inner liner
3. Men's, women's and youth sizes
4. Price starting at \$76.95

**Primetime Kit- Under Armour**

1. Customizable high-performance jersey features UA's Reflexx Armour vent engineered jacquard mesh
2. Shorts provide comfortable 4-way stretch
3. Men's and women's sizes
4. Price starting at \$81.95

#### **Traditional Kit- Holloway**

1. Both jersey and shorts feature Dry-Excel performance fabric that is super-stretchy, snag-resistant and wicks away sweat
2. Freestyle sublimation offers maximum opportunity to customizable decoration stretch
3. Men's and women's sizes
4. Price starting at \$53.95

#### **Fitted Kit- Holloway**

1. Jersey and shorts both feature Dry-Excel performance fabric that is super-stretchy, snag-resistant and wicks away sweat
2. Freestyle sublimation offers maximum opportunity to customizable decoration stretch
3. Men's and women's sizes
4. Price starting at \$61.95

**State of the Art Product**

*Figure 2 State of the Art Product. Hillgrove High School Current Uniform*

For the last few seasons, Hillgrove High has worn the same uniform for the co-ed Varsity team. Their uniform includes the Nike Team Women's Breathe Race Day Singlet and the Nike Team Stock Boy Short. The sports bra is left at the discretion of the athlete as long as it follows color guidelines. I found that the team wears the Nike Dri-Fit Swoosh Sports Bra of different sizes. The singlet is offered by a numerous amount of team uniform companies ranging in different sports, where the prices averages around \$19.88. The singlet advertises that it is "built for training or competition" that has sweat-wicking Dri-Fit technology and minimal seams to cut down on distractions (Running Warehouse). The Nike Women's Team Stock Boy Short is another piece offered by different team uniform companies with a price averaging \$24.95. The short also features sweat wicking Dri-Fit technology and s as well as stretchy fabric for a more secure and comfortable fit. They also feature an elastic tie draw cord for athlete adjustability (Running Warehouse). The Nike Dri-Fit Swoosh bra is a Nike best seller sitting at a price of \$38. It offers medium support, a racer back design and a removable pad insert (NIKE.com)

## Product Anatomy

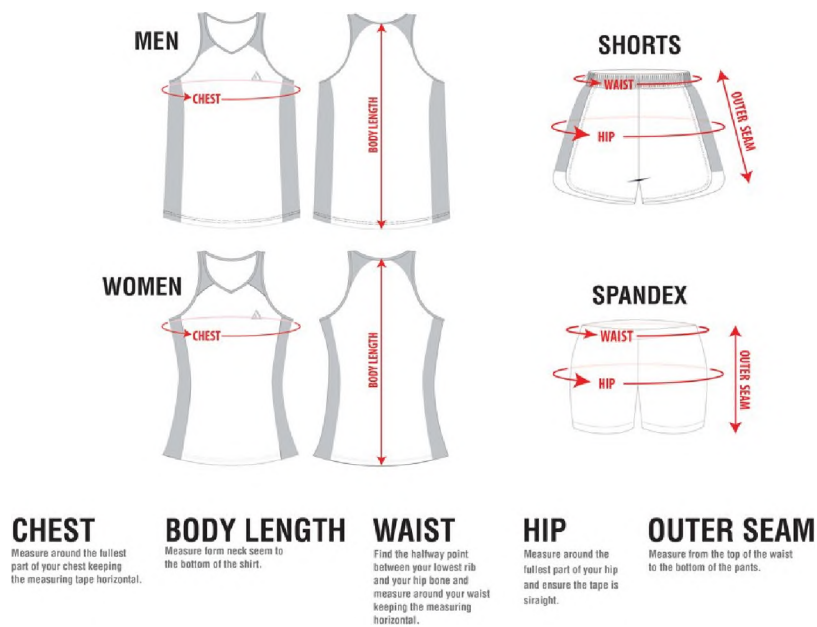


Figure 3 Basic Track Uniform Product Anatomy

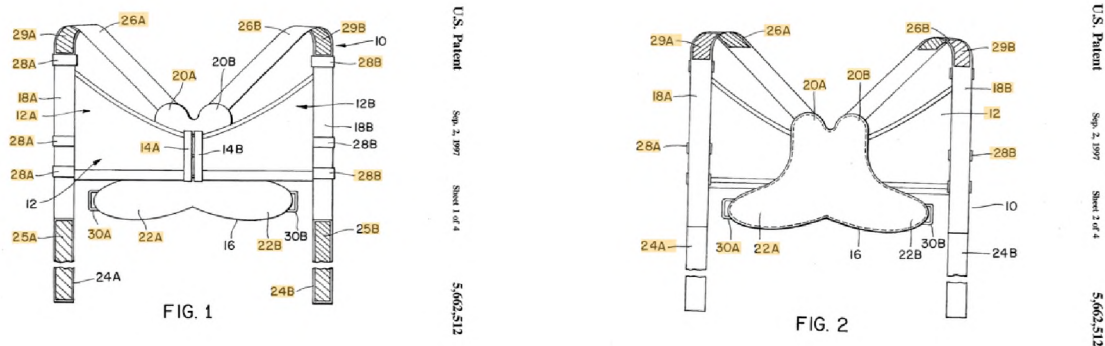
Track and field uniforms for spring break in theory, especially for women. These kits can be full body suits, form fit or loose fit tanks and shorts, tanks and briefs, long sleeve, form fitting tops, arm sleeves, run tights and a variation of any of these given the individuals out of the athlete. Another factor that determines what the athlete chooses to wear depends on the season they are running in with outside temperatures in environmental conditions (Murphy, 2012.) The figure above is just an example of a product uniform anatomy for girls at the high school level containing a basic run short, form fit short, a loose run singlet and form fit singlet.

## Materials and Manufacturing

Track uniforms mostly consist of polyester/spandex or nylon/spandex fabric blends for different properties important to the sport such as: stretch, moisture wicking properties, breathability, and weight. Traditional cut and sew methods are used to make these kits, unless otherwise done using engineered knitting techniques. The best kind of stitch to use for stretch

fabrics are flat seaming, active seaming, or surging stitches in different renditions for how much strength is needed. Given the nature of the sport was here and talk easily because there is no give or flexibility (Storgaard, 2021).

**Patents and Intellectual Property**



*Figure 4 Postural Bra Patent*

“A postural bra for supporting and protecting a woman's breasts, helps prevent and correct a tendency of hyper kyphosis of the backbone. The postural bra comprises a bra body (12), provided in its central front part with vertical shoulder lifters (14A, 14B) and of a posterior support (16). The bra body contains, in its lateral edges, identical straps (18A, 18B) which are connected at one of their edges, to upper parts of the vertical folds (20A, 20B) of the referred posterior support (16) and, in the other edges, to the lower parts of the horizontal folds (22A, 22B) of the referred posterior support (16), from which point adjusting straps (24A, 24B) are lengthened” (Google Patents published by Theo Cohen, 1997). Most of the weight of the breast are carried by the muscles of the upper back and in turn, this is where back, neck and shoulder pain are a result of a lack of breast support that can cause bad posture (Ferguson, 2022). Proper posture allows the nerves to freely flow from the brain to your organs, muscles, joints and

vessels. In sport, dynamic posture allows the body to maintain normal length-tension relationships among the muscles while the activity is being performed (Gambetta, 2015).

Period protective undergarments can be categorized under two facets: a physical aid to hold s pad in place and the other relies on special materials to help absorb and wick away leakage to even replace tampons/pads on lighter days (Eveleth, 2016).

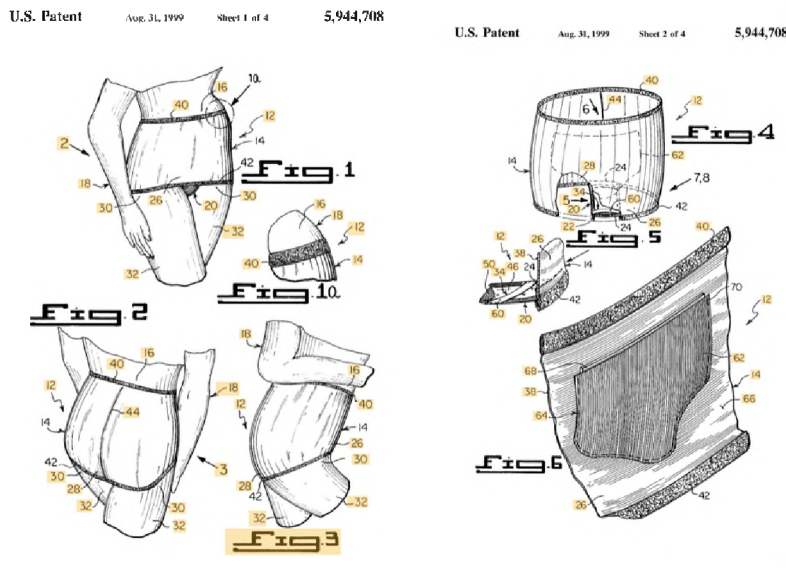


Figure 5 Protective Menstrual Panty Patent (Expirea)

Patent US5944708A

was filed in 1997 by Philpott

Tracey and was publicized in 1999. The patent had an anticipated expiration date of 2017-09-02.

However, it included the following:

- as) a body portion worn around a lower torso of a female person during menses;
- b) a liquid-proof elastic crotch portion including:
  - i) a top sheet made of black LYCRA material, to receive the sanitary napkin, where potential area of leakage is located;
  - ii) a pair of side strips made of black absorbent cotton material, located on opposite sides of said top sheet;

- iii) a side interface protective lining below said top sheet to absorb potential wetness;
  - iv) a middle protective lining to stop the potential wetness;
  - v) a liquid repellent coated on a bottom of said side interface protective lining; and
  - vi) a bottom sheet made of black LYCRA material, so as to disguise any possible leakage therefrom;
- c) means for securing opposite ends of said crotch portion between front and rear lower segments of said body portion, so as to form two openings for insertion of one of a pair of legs of the female person through each opening; and
- d) means for holding a sanitary napkin within said crotch portion in a proper position, so that the sanitary napkin will fit snugly against the inner thighs of the legs, and not tilt to leak from the sides thereof (Google Patents).



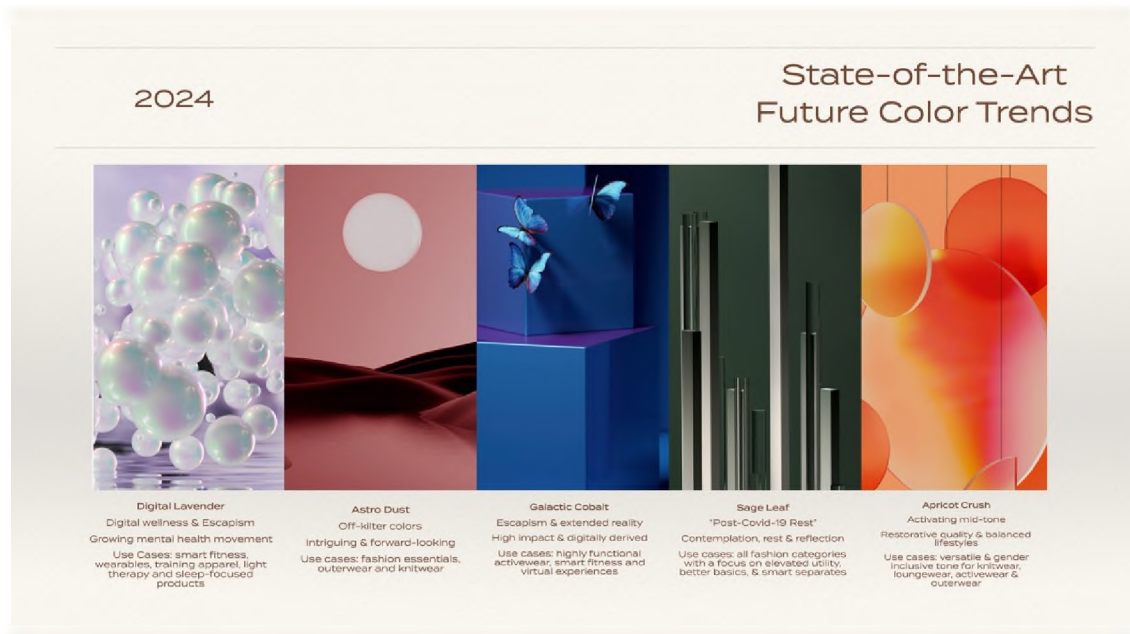
*Figure 6 PantyProp Underwear*

Different companies have also lived in the space of period protection that falls under the two different categories. PantyProp was invented by Crystal Etienne where her goal was to serve women that wear pads more and keeping them in place. The technology is simple as it is a pair of underwear that has an open slot for a pad to slip into to solve the issue of sanitary pad fails (Eveleth, 2016).

THINX and Dear Kate are two brands that rely more so on the use of materials to either prevent leakage or replace tampons and pads all together. THINX is a layered combination of different fabrics designed to pull liquid away from the body and trap it inside the underwear to prevent leakage with the use of a “moisture-impermeable polymer layer” without the use of the common polyurethane. Dear Kate uses a three-layer system: two that wicks away moisture and one that keeps that moisture from leaking through on to your clothes. The layers are made of microfiber polyester, nylon and lycra., with a liquid repellent finish (Eveleth, 2016).

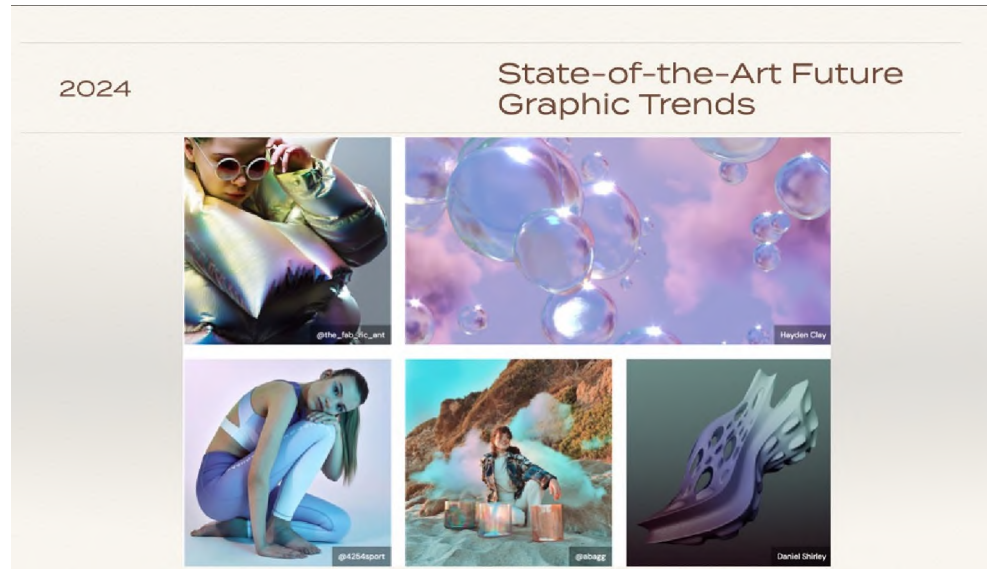


## Colors, Graphics and Logos



*Figure 7 Future color trends for sportswear products*

Post- Covid, the apparel industry is going to enter a realm of regeneration and motivation. Consumers will experience a shift in the emotional states what they look towards the future of healing and balance (WGSN, 2021). Color trends will have more gender inclusivity and attention to different tones of wearers (WGSN, 2021). The five color shown are the future color trends for the end of season '23 into '24. Color plays a major role in these trends as they are going to be using different areas to affect the moods and behaviors of consumers. In gathering more research on how color affects the moods of young black female athletes, I will attempt to use my findings in conjunction with these future trends to provide a pallet that encompasses similar ideals of healing and balance to motivate each individual athlete in their uniforms.



*Figure 8 Future graphic trends for sportswear products*

Logo trends for the future, past 2022 can be seen more through digital presence and engaging the audience with the use of gradients, 3-D logos, nostalgia, monochromatic color schemes, layered luxe, typography focused graphics and more (Goldstein, 2021). Different organizations, schools, etc. have their own logo placement rules. Florence invitational will exhibit uniforms manufactured and styled by the brand minus, so there will be no other brand logos other than minus and Florence invitational. Sponsor/brand logos will follow the placement incise guidelines of the national Federation of State High School Associations.

In conjunction with the future color trends, I focused on color theory and mood when conducting a skin color study to create different athlete color palettes. The research in how these trends were conducted and concluded can be found in Appendix F. The MINUS logo is created with the font style “Bugfast” and styled to ‘subtract’ the middle of the word as a minus symbol.



*Figure 9 MINUS Logo*

Graphics will be further explored with the use of engineered knits and how that technology can create different zoning patterns while also contributing to the style of the uniform.

### **Research Methods**

In order to collect data, there will be a sequence of surveys, interviews and focus groups. Overall data collection about color and uniform preference will be conducted through surveys sent to high school black female track runners. Questions will be tailored to find out how the athletes define their body types themselves, favorite type of uniform to wear, how uniform could be better for them, colors they like to perform in in conjunction with some of the why's to these questions. To further assess body types, a diagram with different shapes is given to the athlete for visual representation. Focus groups will consist of a small group with athletes to design for that present different body types, skin tones and uniform preferences for color customized uniforms. Interviews from those individuals will further discuss their personal journeys as an athlete and hardships they face or have face as a young black athlete.

### **Athlete/user insights**

Insights were gathered through an online survey questionnaire. **Please review appendix A and B for a detailed overview of athlete insights and data.**

**Strengths, Weaknesses, Opportunities and Threats Analysis (SWOT)**

Nike supplies the best competitor products for runners in track and field. I will be analyzing the current uniforms of the track and field team at Hillgrove High School in Powder Springs, Georgia as they are my focus group for this project.



*Figure 10 Hillgrove High Uniforms*

**Nike Women’s Breathe Race Day Singlet**

<i>Strengths</i>	<i>Weaknesses</i>	<i>Opportunities</i>	<i>Threats</i>
Loose, mesh body for better mobility & breathability	Too loose of a body gets in the way of the athlete during performance	Opportunity to push the silhouette while keeping the mobility and breathability aspects for fit and comfort of the garment	Being limited in how many types it can serve with certain silhouettes.

**Nike Women’s Team Stock Boy Short**

<i>Strengths</i>	<i>Weaknesses</i>	<i>Opportunities</i>	<i>Threats</i>
Material blend for good stretch	Very small short and limited in sizing for different body types.	Opportunity for new adjustability elements and silhouette types.	Making the silhouette too complicated
Adjustable drawstring waistband	Tight in certain areas that differ with each body.		

**Nike Dri-Fit Swoosh Sports Bra**

<i><b>Strengths</b></i>	<i><b>Weaknesses</b></i>	<i><b>Opportunities</b></i>	<i><b>Threats</b></i>
<p>Dri-FIT technology pulls sweat away from your skin to help you stay dry and comfortable.</p> <p>Provides medium support for gym workouts, spin, cross training, tennis and running.</p> <p>Removable 1-piece pad designed to load easily from the top and keep a smooth and consistent shape, even after washing</p>	<p>Only provides medium support</p> <p>Inserts don't provide a lot of support</p>	<p>Adding additional support to what is already worn</p> <p>Postural support</p> <p>More lockdown</p>	<p>The garment being too tight over the already existing sports bra</p>

**Performance Testing Plans**

The current uniforms and products will serve as the benchmark. The athletes are from the varsity team at Hillgrove High School in Powder Springs, Georgia. Hillgrove High school is a predominantly white high school. For this project, it is specifically targeting the black girls on that team. The performance metrics tested for after review of the athlete insights included comfort, fit and support. The testing plans were as follows:

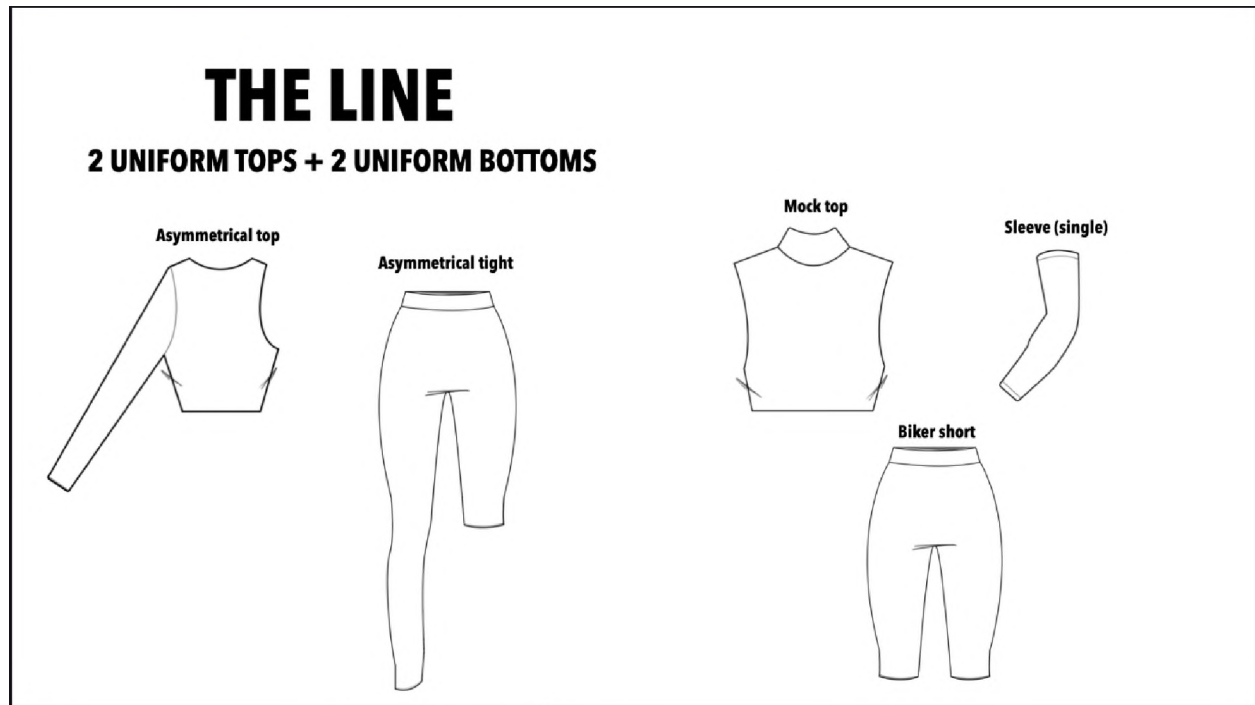
- Fit testing through surveys and video
  - Where is the uniform too loose? Too tight?

- What are the problem areas?
- Examination of the waistband adjustability on the athlete through a fit test
  - Scaled thoughts of comfort from the athletes
  - Test the security of new adjustability fastening system in motion on a treadmill with a graduation of speed
- Dot testing for support (athlete is examined on a treadmill for 15 minutes with a graduation of speed)
  - Test on two different athletes of various chest sizes (one with a sports bra and one without)
  - Measure the athlete highest and lowest point of chest movement in both the benchmark and prototype product and angles
  - Similar dot procedure for bottom to target specific muscle groups with compression
- In-person exercises for thigh compression mapping

Visual representation of each test can be found in appendices C-F

## Ideation

Further development of the line plan of two uniform tops and two uniform bottoms filtered down into a Flo Jo inspired suit with an asymmetrical arm and leg, both being on the athletes leading arm and leg deepening on the athlete. The other suit consists of a mock tank and biker short.



*Figure 11 Line plan*

Ideating happened in two different phases: studying the body in motion and studying different knit garments to assess the right details for a knitted garment. The question to answer in this line is: How can we empower black, high school, female track and field runners through engineered knit performance apparel that adjusts to developing bodies and improves comfort? The use cases

for these kits would include: warm-ups, competition and recovery.

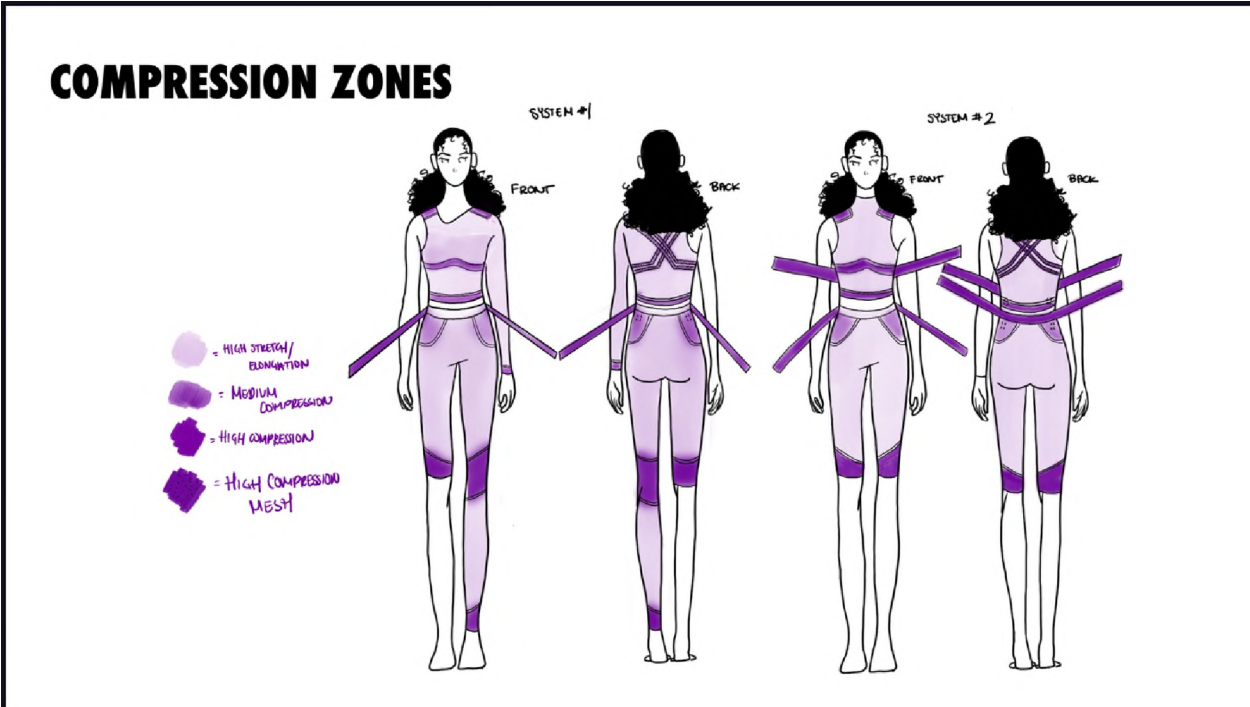


Figure 12 Zoning sketch ideation

**Technologies**

**Flex-Fit**

Flex-Fit is a technology for athlete adjustability through graduated compression bands in the top chest band and the tight/short waistband.

**Flex-Form**

Flex-Form is a targeted compression technology in the tight/short that keeps the major muscle groups such as the hamstrings and quads closer to the body, reducing the vibration upon impact from the force of the athlete during the drive phases and aiding in recovery for healthy blood flow.

**0 Gravity**



0 Gravity is a lift and lockdown zoned compression in the top for better support of the breast and back of the athlete experience various body changes and weight gain in this area.

**Prototyping**

During Winter term, traditional cut and sew methods were used for the completion of the garments. After further evaluation of the intricacy of detailing needed in these garments, it was then decided to study engineered knits to fully bring these technologies to life. More rounds of prototypes were made by sewing different knit garments together to mimic the functional intention of an actual warp knit, seamless garment. Other prototyping methods included



*Figure 13 Prototyping*

sublimation by creating digital representation of engineered knits and using Bemis to show design intention of compression zoning.

### Testing and Validation

The validation of technologies was completed in a few different phases.

#### *Flex-Fit | Can be found in Appendix C*

Flex-Fit testing consisted of a fit and wear test of the athlete trying on the current benchmark product and showing adjustability. Further analysis into the garment continued in how the garment was made and how it performs on the body. The current benchmark product consists on an inch and a half, elastic waistbands that is adjustable with a thin drawstring that is fixated to the back of the short. The athlete was given a survey on the comfort of this waistband technology where it overall averaged a 2.75/5 on a comfort scale. Other concerns from athletes this product proposed included:

- Coming undone or loosened
- No medium between too tight or too loose
- Not having any give once tied
- Rubbing of the drawstring on the inside of the short

The new technology consists of lengthening the front waistband to extend outward, while the back is a knitted, form-fitting rib. The extended waistband would fixate to the back of the short/tight through a fastening system unique to MINUS. The working prototype saw a 65% increase in the comfort level on the athlete as it provided:

- No bunching
- Better security

- Some give even while fixated due to the stretch

***Flex-Form | Can be found in Appendix D***

Testing for flex form happened in two phases: studying the athletes in motion during track workouts and performing a dot test on a treadmill to find the highest points of motion for body map zoning for the knitted compression. The major muscles groups athletes were wanting to keep closer to the body were the hamstrings and quadriceps. The dot testing was performed with the benchmark short and a work like proto by MINUS. Another issue found during this test was the rising of the short while in motion of the athlete. The work like prototype included different knits of different compressions sewn together in those areas needed to see how they would compress those parts of the body while also testing the comfort level for the runner.

Given the nature of this test and prototyping, further validation took place amongst professionals in this space.

- “I feel like they’re good areas for the compression since a lot of power comes from glutes, hamstrings and quads. I love the concept and a great target audience.” Raevyn Rogers | American Middle-Distance Athlete
- You’ve got the support you need in the garment with the compression placement. The placement also works well for recovery a lot due to the adjustability during the workout and a little more relaxed but still supportive by loosening post workout. The angular placement in the thigh compression zones would be much more comfortable than straight horizontal across that muscle. I like it being at an angle.” Krista Cary Martenson | UO Innovation Lab Apparel Manager

***0 Gravity | Can be found in Appendix F***

0 Gravity was tested on a treadmill using dot testing to find whether or not the new garment was more supportive or added more support to the current sports bra benchmark product worn under the uniform top. Athlete 1 (chest size 34B) ran for a total of 15 minutes with a gradual increase of speed in the benchmark product and MINUS working prototype (with the benchmark sports bra on). The angle in which her angle sat at her highest and lowest points were used to determine if there was support in the top to lock in and lift her chest up. Her chart is as follows:

<i>Benchmark highest point</i>	<i>Benchmark lowest point</i>	<i>MINUS highest point</i>	<i>MINUS lowest point</i>
57 degrees	68 degrees	55 degrees	63 degrees

From her highest point, there was a 2-degree reduction and from her highest point a 5-degree reduction showing the athlete is experiencing a lift in the garment that is supporting her more.

The second athlete was tested in the same fashion, without the benchmark sports bra on. The athlete also was a larger chest than the previous (chest size 34 DDD). Her chart is as follows:

<i>Benchmark highest point</i>	<i>Benchmark lowest point</i>	<i>MINUS highest point</i>	<i>MINUS lowest point</i>
75 degrees	63 degrees	59 degrees	55 degrees

### Final Prototypes



Figure 14 Proto Callouts





