Innovative Protection in Apparel

Transforming Designs from
Inspiration to Innovation

xrd extreme impact protection

Performance Days
November 3, 2015

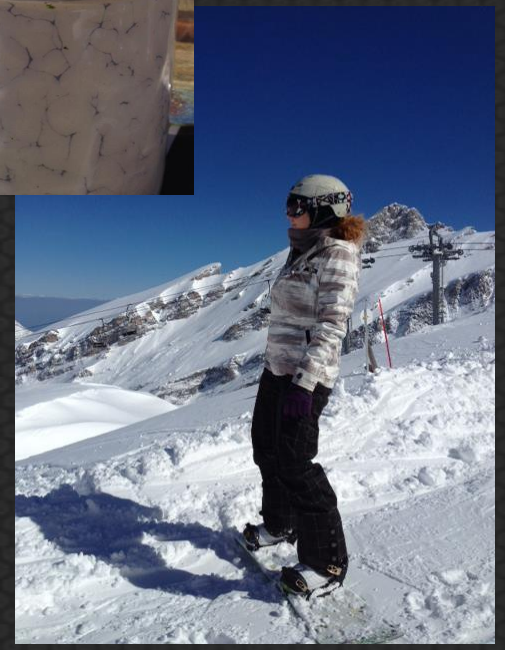
Angela Walters
Brand Manager

About XRD® Impact Protection

- Focus on impact protection and comfort solutions for apparel and footwear.
- Experience with wide range of markets
  - Sporting goods, outdoor, active, work, lifestyle
- A division of Rogers Corporation
  - Over 180 years materials technology engineering and manufacturing expertise
- XRD® Impact Institute – Rogers, CT
  - In-house research, design and testing center


Boston
We Will
Finish The Race
The stories behind these shoes
begin on page 70


Soleil
Neige




LIFE'S
BETTER IN
ANNECY


I


university
studies
brand
parents
wearable
2015
athletes
mtb
breathable
high
gear
technology
flexible
impact protection
knee
lightweight
developing
best
protector
helmet
outdoor
hits
better
cycling
sports
ski
fashion
performance
racing
school
vtt
guard
enjoying

Today’s Goals:

- How do I find the best mix of technology incorporation, functionality and aesthetics to aid my athlete’s performance?
- What process can help me create unique solutions?
- How can I improve my chances for success?

Your Challenge:

Create New Product Designs That Incorporate

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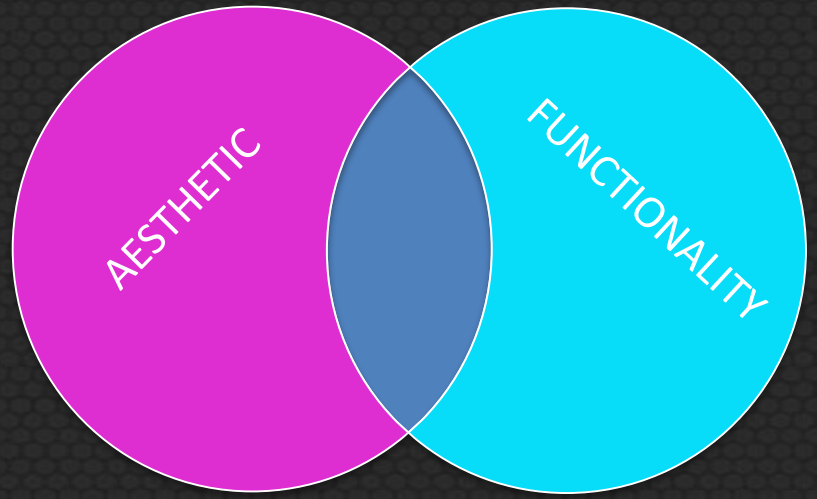

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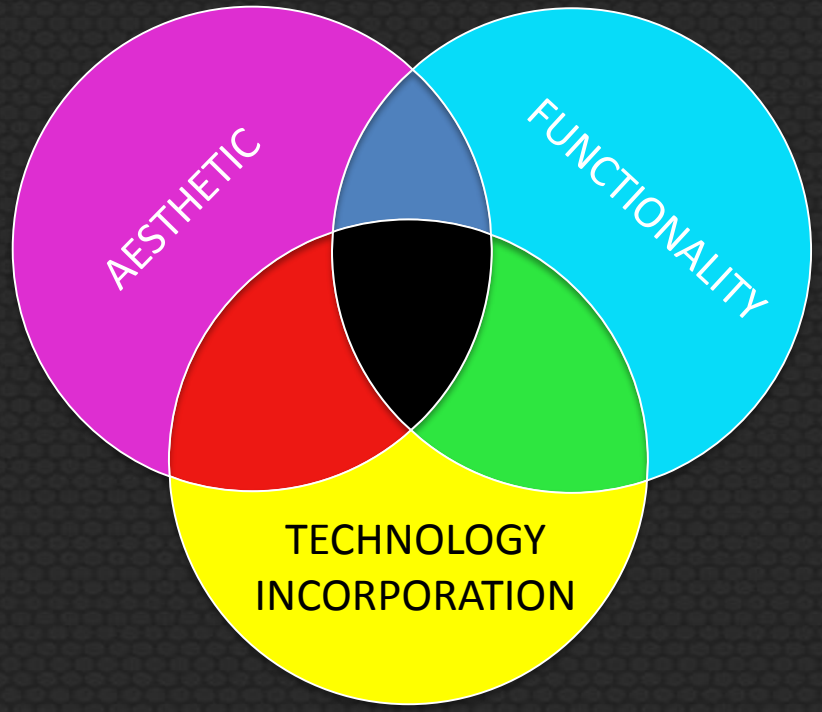

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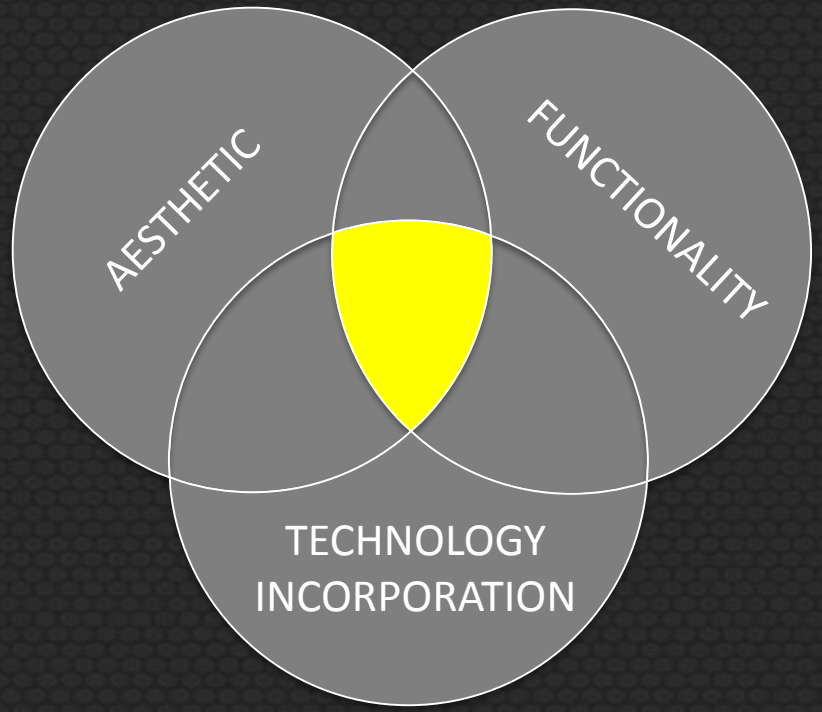
Complete Solution



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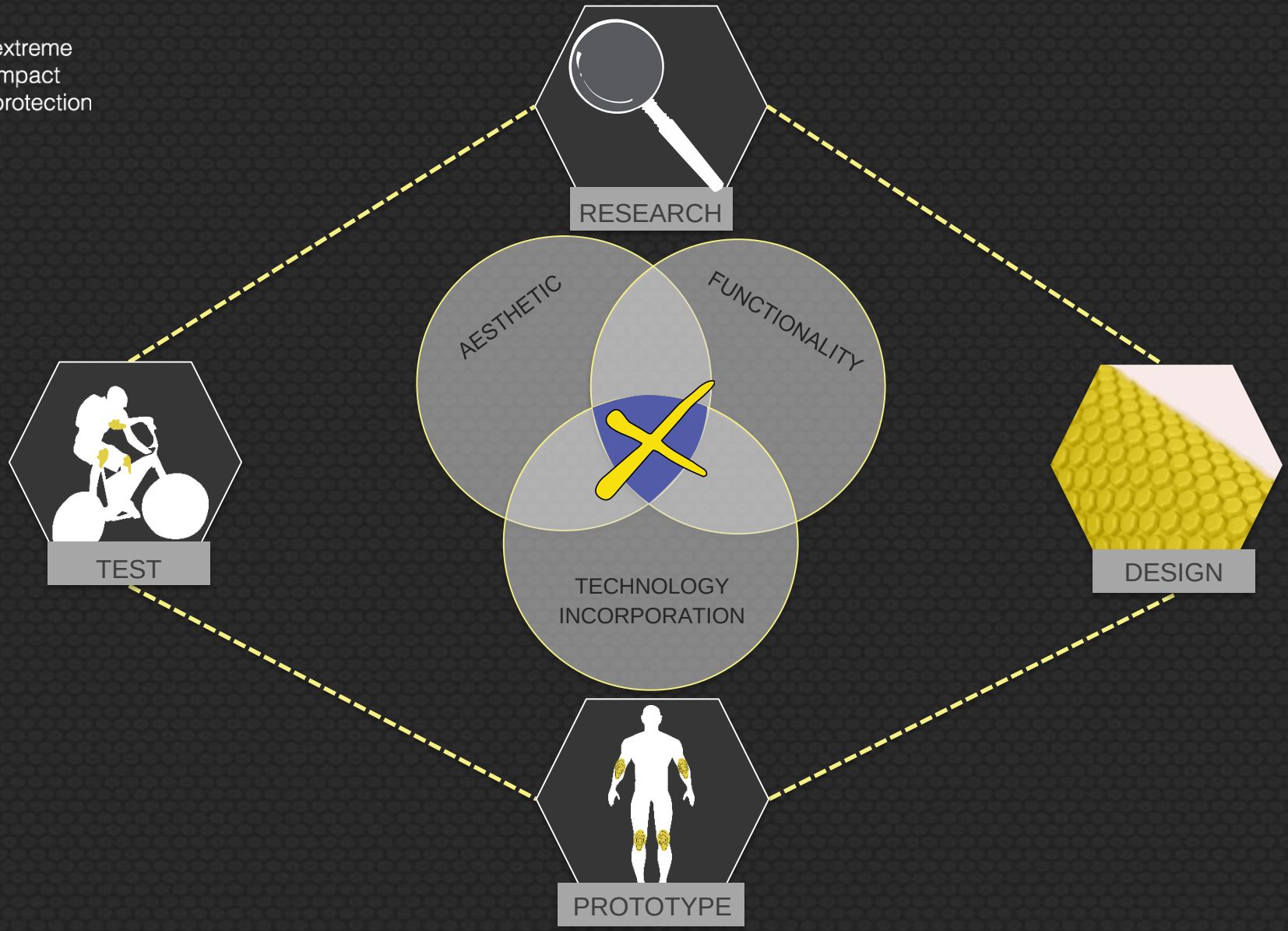

INSPIRATION

INNOVATION

“my first day snowboarding…”

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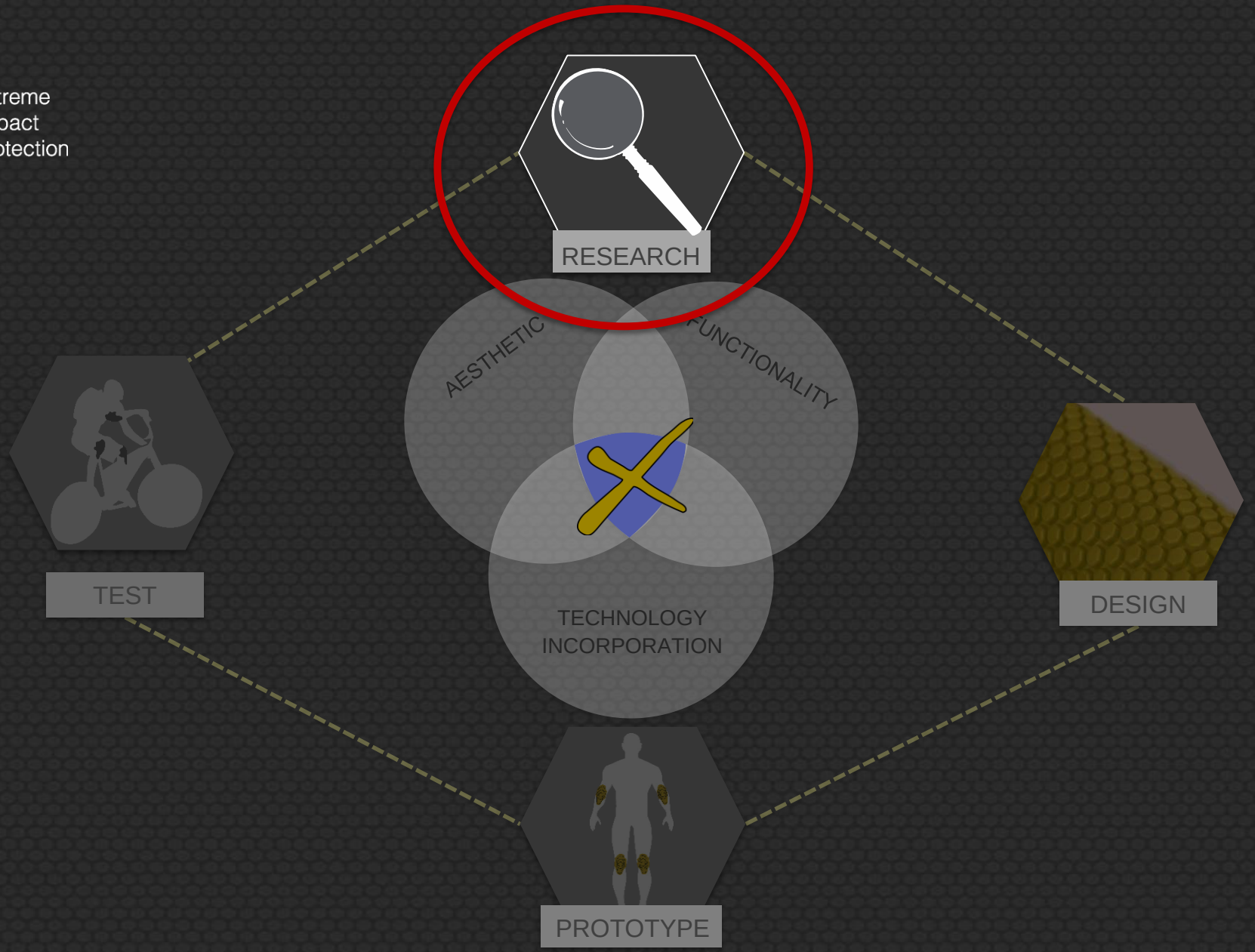

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Female Snowboarder Interviews:

Important Features for Knee Padding:

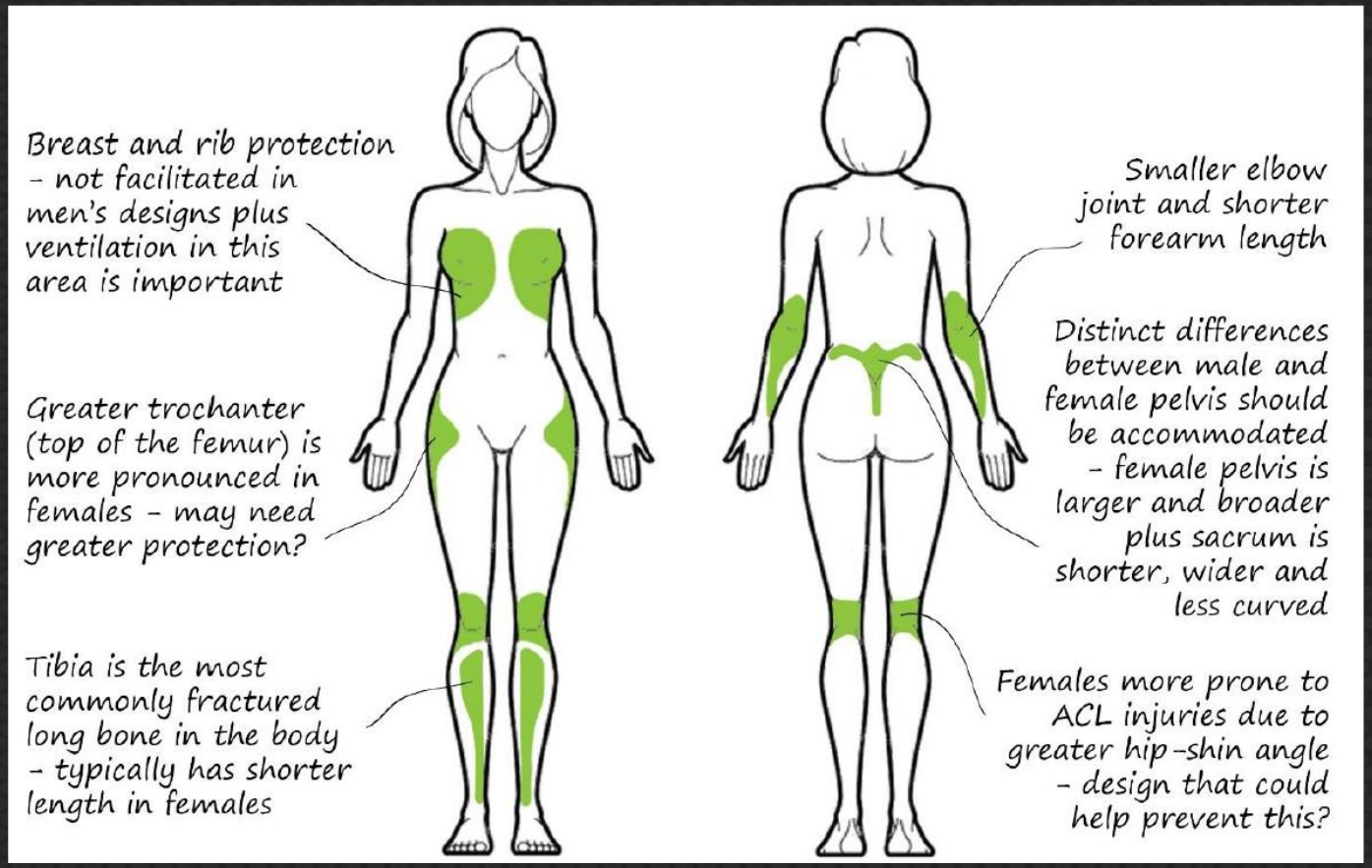
- Flexible, non-restrictive
- Size and fit
- Lightweight
- Thin / low profile
- Durable protection

Marketing Info:

- Looked for a “How It Works” story
- Shared their product experience
- When applicable, often bought for family (husband, children)
- Hard shell products perceived as more protective than soft shell

Epidemiology

Example for female-specific designs



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To Consider When Reviewing Impact Protection Technologies

- Materials that support your design needs
  - Range of impact solutions
  - Standard vs custom designs
  - Material flexibility
  - Fit and sizing
  - Attachment options
  - Wash standards
  - Wear and durability

- Company that supports your development
  - Design and testing capabilities
  - Quality control
  - Manufacturing and sales

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Evolution of Impact Protection Technologies

An extinct pair of knee pads?

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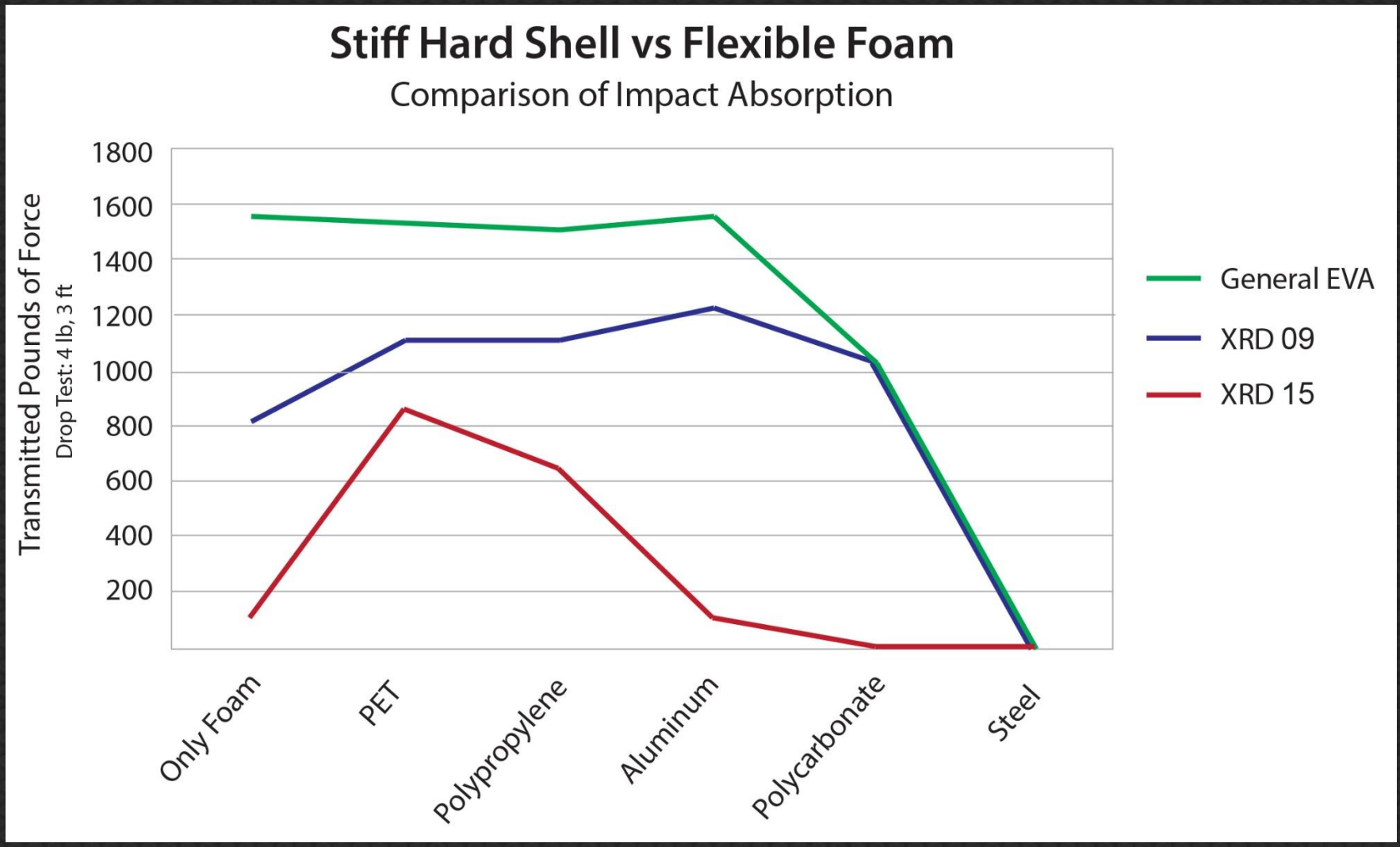

Test Conclusion: Choose a high quality, soft and flexible foam

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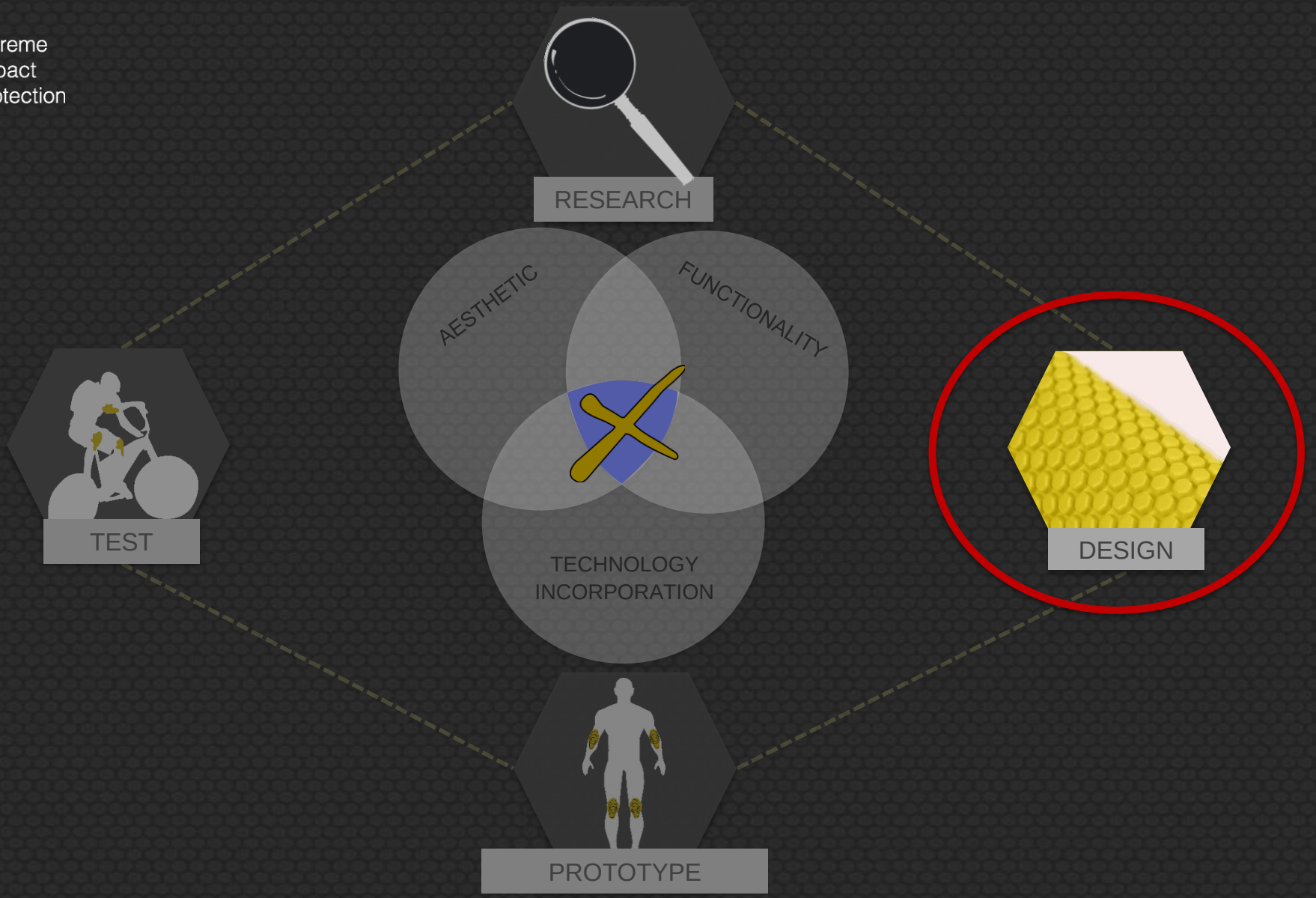

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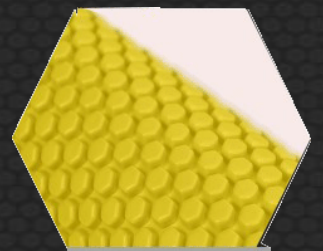
Focus on Flex Lines



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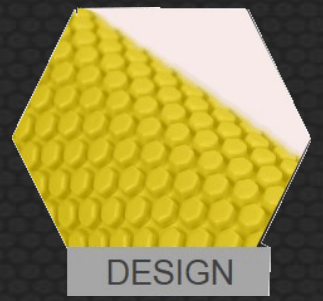
Focus on Flex Lines



Tips for Success:

1. Thin to Win

$$F = \frac{4EwdH^3}{L^3}$$

F = force required to flex
H = thickness

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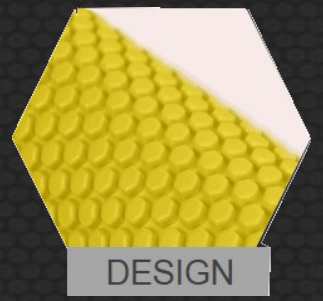
Focus on Flex Lines



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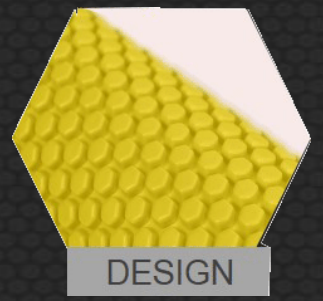

Tips for Success

1. Thin to Win
2. Flex with the body and length of pad

Hinges run length of pad, flexing in same direction as body

Hinging not designed for optimum freedom of movement

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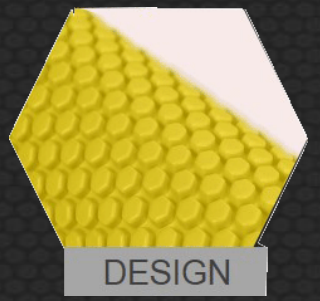
Protection Enhancing Design Cues



Ex: Tessellated Patterns

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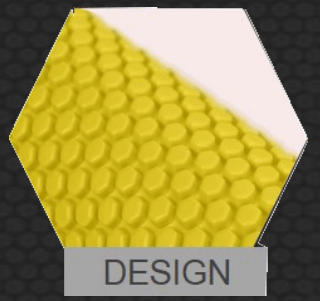
Protection Enhancing Design Cues



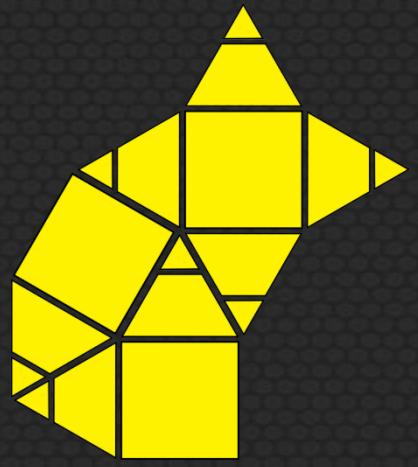
Ex: Tessellated Patterns

Penta

Hexa

Starry Night

Geo



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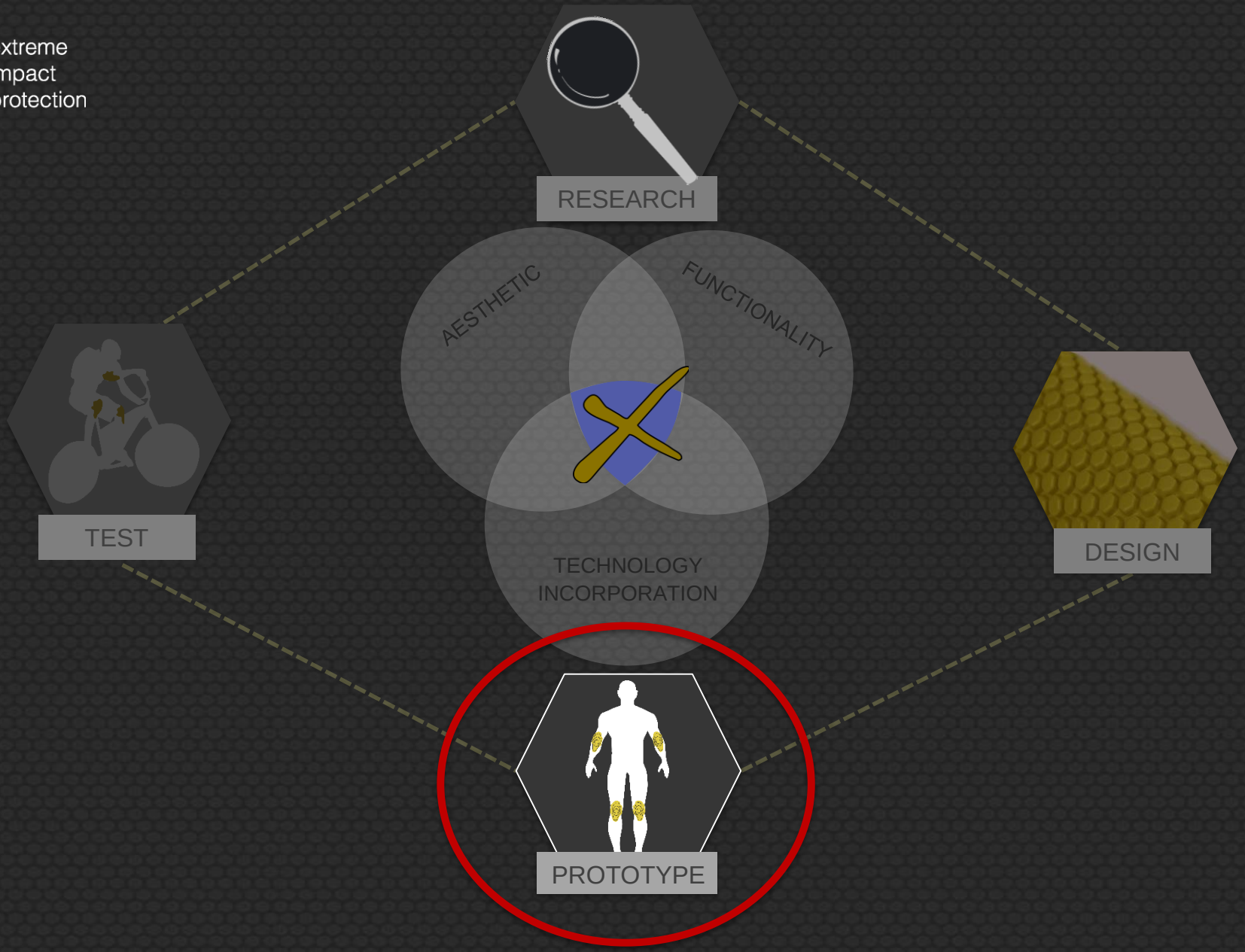

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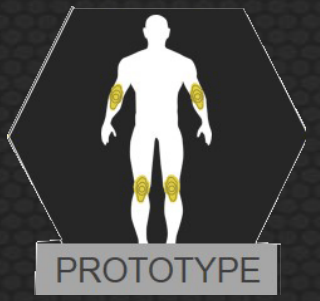
Prototyping Best Practices



- Start as soon as you can
- Involve your materials supplier
- Magic #6
- Fast iteration

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PROTOTYPE

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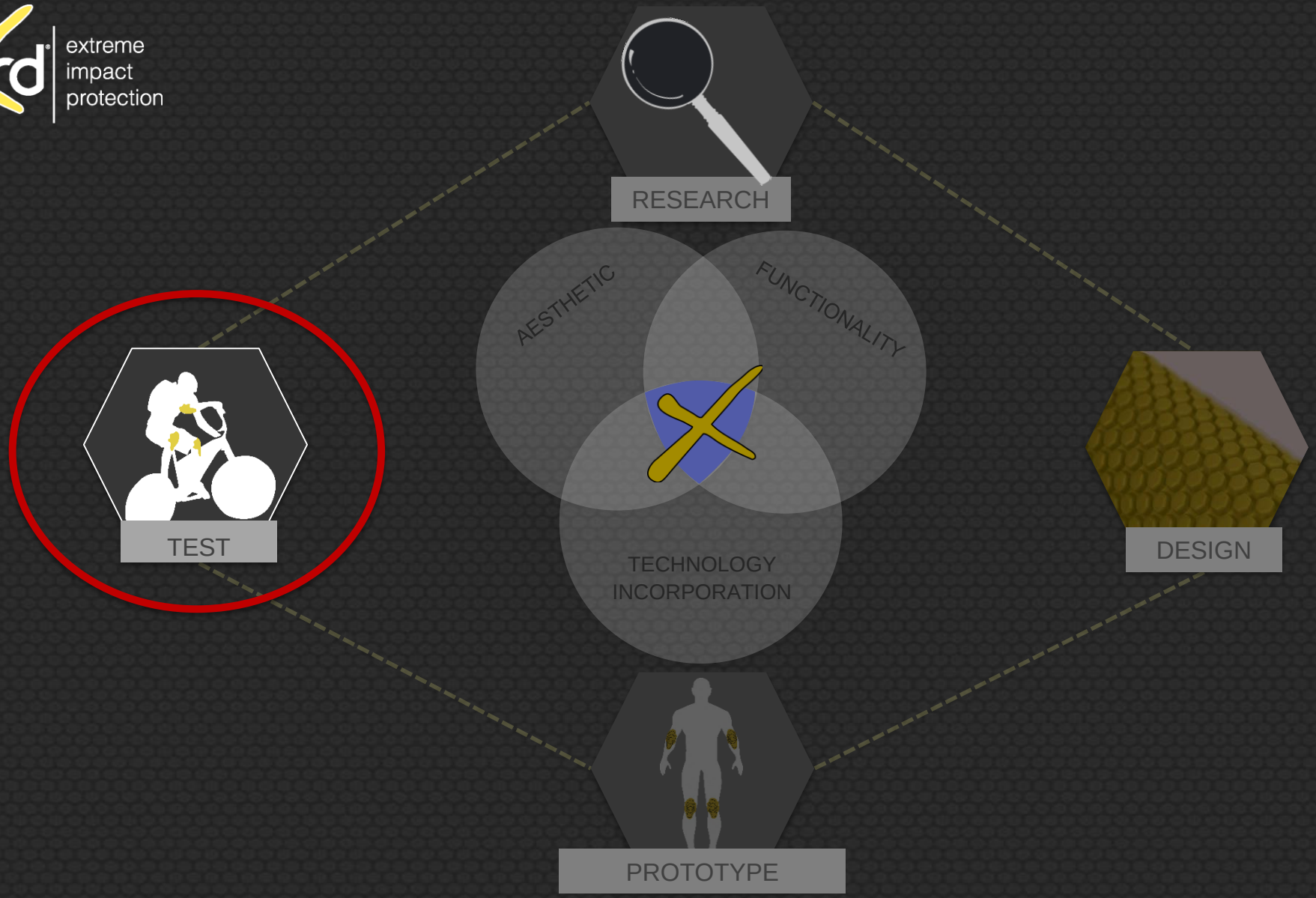

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Testing Best Practices

- Start now!
- Lab testing
  - Testing to standards
  - Against competitive products
  - To design criteria
- End use testing
  - Meets your design criteria
    - Ex: flex, moves with body, low-profile
- Can start gathering marketing stories
  - Ex: end user sound bites

TEST

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TEST

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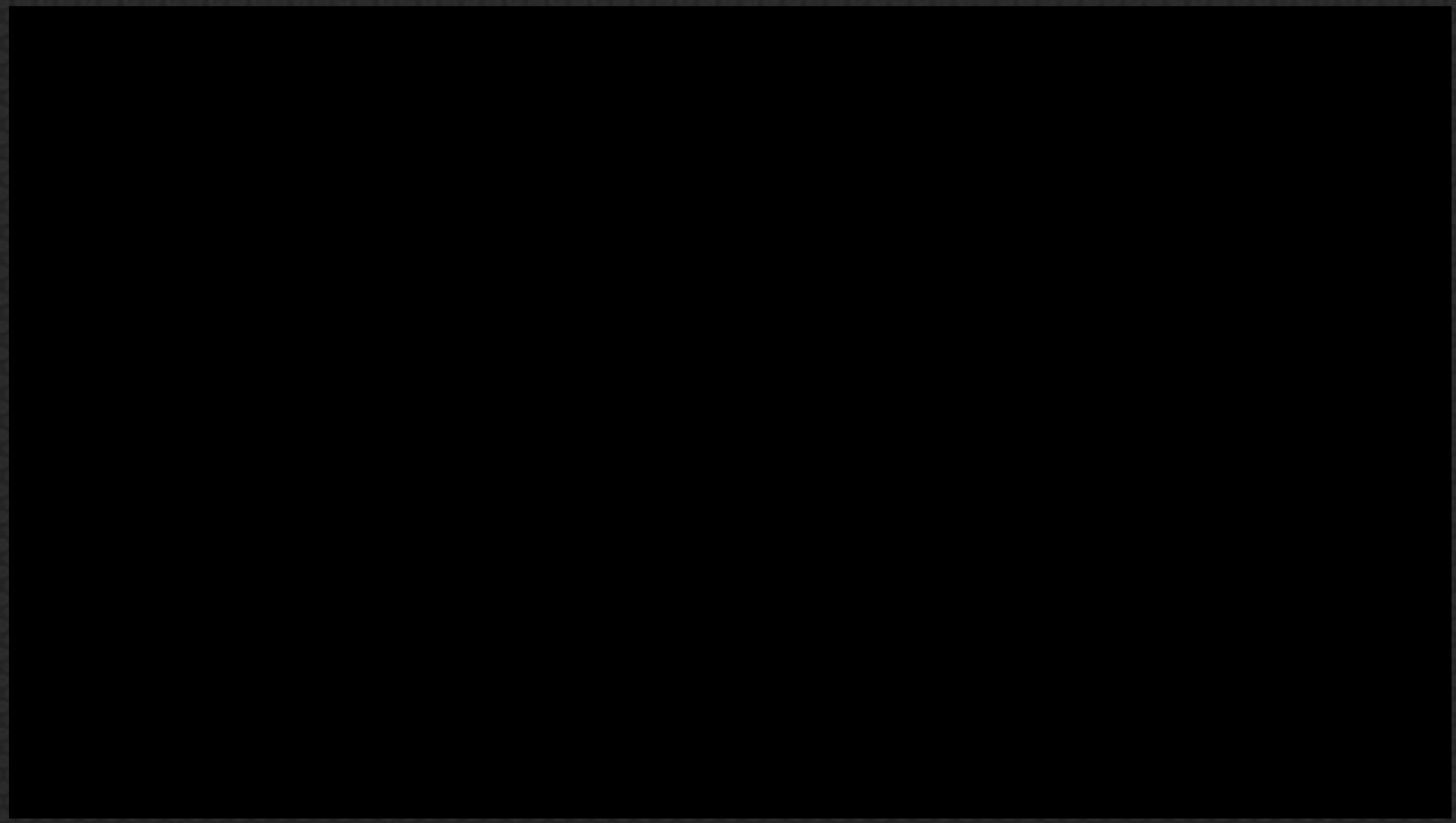

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www.xrd.tech

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