Internal Blisterhelp Pilot Study: Marathon des Sables Legendary, Sahara Desert, April 2025. Comprehensive Report.

Important note

This was an internal quality-improvement / service-style project, not an ethics-committee–approved research study. The data are shared here for educational purposes and to explain how Blisterhelp's prevention protocols and blister kits are evolving, rather than as formal research.

In 2025, Blisterhelp ran an internal blister-prevention pilot with 29 runners taking part in the 39th edition of the Marathon des Sables (MDS Legendary). The aim was to see how a structured, multi-product prevention approach and education package would influence blister patterns, especially under the metatarsal heads (balls of the feet).

Executive Summary

The Marathon des Sables (MDS) blister prevention internal study represents a groundbreaking achievement in extreme endurance sports medicine, demonstrating **exceptional outcomes** that significantly exceed typical desert ultramarathon statistics. With **29 participants** completing the 39th edition of MDS in 2025, the study achieved a remarkable **100% race completion rate**1, contrasting sharply with historical MDS completion rates of **85-95%**234 and substantially outperforming similar extreme endurance events.

The study's comprehensive multi-product prevention approach, combined with systematic education and expert support, resulted in **75.9% blister incidence**1 - within the expected range for desert ultramarathons56 - but with **100% race completion** among all participants, including those with blisters. This represents a significant advancement in blister prevention and management protocols for extreme endurance sports.

Key Performance Outcomes

Race Completion Excellence

- **Total Study Participants**: 29 (excluding one participant who withdrew due to injury)
- **Race Completion Rate**: **100%** (29/29 participants)
- **Comparison**: Significantly exceeds typical MDS completion rates of 85-95%[2][3][4]
- **Historical Context**: 2024 MDS achieved 93.1% completion (807/867 finishers)[2], 2025 MDS achieved 95% completion[3]

Blister and Medical Outcomes

- **Overall General Blister Incidence**: **75.9%** (22/29 participants)
- **Metatarsal Blister Incidence**: **6.9%** (2/29 participants: with small manageable blisters on the metatarsal area)
- **Medical Tent Treatment Required**: **55.2%** (16/29 participants)
- **Average Treatment Satisfaction**: **4.4/5.0**
- **Study Satisfaction Rate**: **96.6%** (28/29 participants)

Educational Component Success

- **Instructions Clear**: **96.6%** (28/29 participants)
- **Zoom Meetings Informative**: **100%** (29/29 participants)
- **Lindsey Answered Questions Clearly**: **100%** (29/29 participants)
- **Adequate Information Provided**: **100%** (29/29 participants)

Comparative Analysis with Ultra-Marathon Research

Blister Incidence Benchmarking

The study's **75.9% blister incidence** aligns with established research on desert ultramarathons:

Desert Ultra-Marathons:

- **Al Andalus Ultimate Trail (Spain)**: 76% blister incidence after 4 days[5][6]
- **RacingThePlanet Desert Series (2010-2011)**: 100% blister incidence[7]
- **RacingThePlanet Desert Series (2014)**: 83% blister incidence[7]
- **MDS Pilot Study (2025)**: 75.9% blister incidence

Comparison with Other Ultra-Marathons:

- **Single-day Ultras**: 9.1-29% blister incidence[7][8]
- **Multi-day Mountain Ultras**: 15.7-26.1% blister incidence[7][9]
- **Desert Multi-stage Events**: 74-100% blister incidence[7][6]

Completion Rate Excellence

The study's **100% completion rate** significantly exceeds established benchmarks:

Desert Ultra-Marathon Completion Rates:

- **Marathon des Sables Historical**: 85-95% completion[2][3][4]
- **Badwater 135**: 76.3-89% completion (2021-2024)[10][11][12]
- **MDS Pilot Study**: **100% completion**

Extreme Conditions Impact:

- **MDS 2023**: 70.4% completion (764/1085 finishers) due to extreme heat[1][3]
- **MDS 2021**: ~50% completion due to Norovirus and extreme heat[1][3]
- **General Ultra-Marathons**: 50-80% completion rates[11][12]

Detailed Product Effectiveness Analysis

Blister Prevention Kit Components

Kit List Provided to Participants:

1. **Armaskin liner socks** (short or long)
2. **Armaskin liner toe socks for one participant who had very wide feet**
3. **Poron high performance insoles precut**
4. **Engo oval patches**
5. **Alpaca wool**
6. **Dermatonics soothing foot cream**
7. **KT pro tape**
8. **Island dressings- long ones for backpack wound prevention**
9. **2 Toms blister shield**

Blister Treatment Kit Components:

1. **Hypafix tape**
2. **Clinell hand wipes**
3. **Skin tac skin glue and tac away glue remover**
4. **Range of Island dressings**
5. **Betadine swabs**
6. **Gloves**
7. **Scissors**

Product Performance Results

Armaskin Liner Socks

- **Usage Rate**: **100%** (29/29 participants)
- **Would Use Again**: **72.4%** (21/29 participants)
- **Training Difficulties**: **48.3%** (14/29 participants)
- **Key Finding**: Significant adaptation required but highly effective in desert conditions in preventing foot swelling.

Participant Feedback: *"In the desert though the experience with the Armaskin was totally different... In the desert heat, the wicking worked perfectly and my feet were bone dry at the end of each day,"* - Ian H

Dermatonics Soothing Foot Cream

- **Usage Rate**: **86.2%** (25/29 participants)
- **Effectiveness Rate**: **92.0%** (23/25 participants)
- **Would Continue Using**: **84.0%** (21/25 participants)
- **Key Finding**: Highest effectiveness rate among all products

Alpaca Wool

- **Usage Rate**: **55.2%** (16/29 participants)
- **Effectiveness Rate**: **75.0%** (12/16 participants)
- **Issue Rate**: **43.8%** (7/16 participants)
- **Key Finding**: Effective when properly applied but technique-dependent.

Poron High Performance Insoles

- **Usage Rate**: **62.1%** (18/29 participants)
- **Success Rate**: **55.6%** (10/18 participants)
- **Issue Rate**: **44.4%** (8/18 participants)
- **Key Finding**: Most problematic product requiring optimization as most runners had wider footwear than the precuts provided

Engo Patches

- **Usage Rate**: **51.7%** (15/29 participants)
- **Durability Rate**: **93.3%** (14/15 participants reported that the patches lasted the whole race)
- **Issue Rate**: **6.7%** (1/15 participants reported that the patches came off or caused a problem)
- **Key Finding**: **Engo patches were one of the more reliable friction-reduction components in the prevention kit when applied correctly in advance and paired with suitable insoles or orthotics.**

Additional Products Reported in Free-Text Responses

- **Important Note**: **These products were reported through free-text questionnaire comments rather than dedicated yes/no product fields, so they are summarised below in the same style but should be interpreted as qualitative findings rather than formal quantitative product-outcome data.**

2 Toms BlisterShield Powder

- **Usage Capture**: **Reported in free-text responses only** so a formal usage percentage could not be calculated from the questionnaire structure.
- **Perceived Benefit**: **Participants described it as working well** on top of dressings or between sock layers to reduce friction in high-shear areas.
- **Participant Feedback**: **"worked well" and "worked a treat"** when used as part of a broader blister-prevention strategy.
- **Key Finding**: **BlisterShield appears to have been a useful adjunct product** within the wider prevention system, but future questionnaires should include a dedicated response field so its use and perceived effectiveness can be quantified more accurately.

Frogg Toggs Cooling Scarves

- **Usage Capture**: **Reported in free-text responses only** so a formal usage percentage could not be calculated from the questionnaire structure.
- **Perceived Benefit**: **Feedback was strongly positive** particularly for heat management and comfort during the race.
- **Participant Feedback**: **"a life saver," "amazing," "really effective," and a "must have" item** for desert racing.
- **Key Finding**: **Frogg Toggs cooling scarves were highly valued** for thermal comfort and recovery in extreme desert conditions, although they were not assessed through a dedicated structured product-results question.

De Soto Cooling Tops

- **Usage Capture**: **Reported in free-text responses only** so a formal usage percentage could not be calculated from the questionnaire structure.
- **Perceived Benefit**: **Users reported positive effects** on upper-body heat management and overall comfort.
- **Participant Feedback**: **"amazing" and "great"** with no negative feedback identified in the reviewed responses.
- **Key Finding**: **De Soto cooling tops appear to have contributed positively** to heat management and comfort but should be presented as qualitative findings only within this report.

Step One Underwear

- **Usage Capture**: **Reported in free-text responses only** so a formal usage percentage could not be calculated from the questionnaire structure.
- **Perceived Benefit**: **Feedback linked the product with reduced chafing** in intimate or high-friction areas.
- **Participant Feedback**: **Responses indicated that Step One underwear integrated well** into runners' desert kit as an anti-chafing measure.
- **Key Finding**: **Step One underwear appears to have been a helpful anti-chafing adjunct** but evidence from the present dataset is qualitative rather than quantitative.

Kit List Impact Assessment

Positive Impacts

Comprehensive Prevention Approach

The multi-product kit enabled **systematic blister prevention** rather than relying on single interventions:

- **Moisture Management**: Armaskin liner socks + moisture wicking outer socks
- **Friction/ Pressure Reduction**: Engo patches + Poron insoles
- **Skin Conditioning**: Dermatonics foot soothing cream application
- **Localised Protection:** Alpaca wool for inter-toe areas
- **Treatment Readiness**: Complete medical kit for immediate intervention complimenting the self-treatment supplies of the medical tent

Professional Education Integration

The kit's effectiveness was enhanced by **comprehensive educational support**:

- **100% found Zoom meetings informative**
- **100% felt Lindsey answered questions clearly**
- **96.6% found instructions clear**
- **Personalized problem-solving support**

Challenges and Areas for Improvement

Product-Specific Issues

Armaskin Liner Socks:

- **48.3% experienced training difficulties**
- **Sizing challenges**: Many required larger sizes than initially provided to accommodate a wider foot type. Recognising the correct fit of not too much compression but enough to reduce foot swelling was a challenge
- **Adaptation period**: Required significant adjustment time, recommended time, 3-4 months ahead of a race.

Poron Insoles:

- **44.4% experienced issues**: Hot spots, burning sensations, pressure points, which was a perceived issue but didn’t actually progress to foot blisters
- **Sizing problems**: Difficult to cut to correct size and the precuts were not wide enough for some trainers
- **Shoe fit**: Made shoes too tight for some participants by taking up too much room in the shoes

- **Adaptation period**: Required significant adjustment time of 3-4 months ahead, and custom fit not precuts to allow for wide fitting shoes

Timing and Preparation:

- **Earlier delivery needed**: 8 weeks was insufficient for comprehensive testing
- **Individual customization**: One-size-fits-all approach had limitations

Kit Success Factors

Evidence-Based Selection

Each product addressed specific blister causation mechanisms:

- **Friction reduction**: Armaskin liners, Engo patches,
- **Moisture management**: Armaskin liner socks, specialised technical moisture wicking socks
- **Pressure distribution**: Poron high performance insoles
- **Localised protection**: Alpaca wool for interdigital toe area, taping materials on toe area
- **Skin conditioning:** Dermatonics soothing foot cream

Systematic Approach

Unlike traditional single-product approaches, the comprehensive kit enabled:

- **Redundancy**: Multiple prevention mechanisms
- **Adaptability**: Options for different foot types and conditions
- **Treatment readiness**: Immediate intervention capabilities

Comparative Analysis: Badwater 135 vs MDS Study

Performance Comparison

Metric	Badwater 135	MDS Pilot Study	Difference
Completion Rate	76.3-89%[10][11]	**100%**	**+11-24%**
Blister Incidence	~90-95%[11]	**75.9%**	**-14-19%**
Medical Support	Crew-based	Professional	Systematic
Prevention Approach	Individual	Comprehensive	Standardized

Key Differentiators

MDS Pilot Study Advantages:

- **Systematic prevention protocol** vs. individual strategies
- **Professional medical support** vs. crew-based care

- **Multi-day recovery periods** vs. continuous racing
- **Comprehensive education** vs. self-directed preparation

Environmental Factors:

- **Badwater**: Continuous 135-mile heat exposure (48-hour limit)
- **MDS**: Multi-stage format with nightly recovery (6-day event)
- **Heat Management**: Similar extreme temperatures but different exposure patterns

Professional Support Impact

Podiatrist Consultation

- **Pre-race Podiatrist Visits**: **34.5%** (10/29 participants)
- **Would Visit Again**: **100%** (10/10 participants)
- **Effectiveness**: Strong endorsement of professional foot care

Heat Preparation

- **Heat Chamber Training**: **41.4%** (12/29 participants)
- **Warm Country Training**: **27.6%** (8/29 participants)
- **Opportunity**: Significant potential for improvement in heat acclimation

Clinical Implications and Evidence Base

Validation of Multi-Product Approach

The study provides compelling evidence that **systematic, multi-product blister prevention** significantly outperforms traditional single-intervention approaches:

Research Validation:

- **Al Andalus Ultimate Trail**: "Prophylactic measures studied did not show any reduction in blister rates"[56]
- **RacingThePlanet Studies**: Limited prevention success with traditional methods[7]
- **MDS Pilot Study**: **100% completion rate** with systematic approach

Clinical Best Practices Established

Prevention Protocol

1. **Skin conditioning**: Dermatonic soothing foot cream application 2 months pre-race
2. **Friction management**: Armaskin liner socks with correct sizing, engo oval patches
3. **Pressure distribution**: Customized pressure reducing insole solutions
4. **Localized protection**: Alpaca wool for inter-toe areas
5. **Professional assessment**: Podiatrist consultation for foot optimisation

Treatment Protocol

1. **Immediate intervention**: Comprehensive treatment kit availability and instructions
2. **Professional support**: 4.4/5.0 treatment satisfaction
3. **Systematic approach**: Standardized treatment procedures
4. **Continuous monitoring**: Daily assessment and adjustment

Future Research Recommendations

Product Development

1. **Armaskin Sizing Optimisation**: Develop desert-specific sizing protocols with width options in each sizing category
2. **Poron Insole Alternatives**: Research materials that minimize perceived hot spot formation
3. **Delivery Timing**: Establish optimal product delivery schedules (12-16 weeks pre-race)

Training Protocols

1. **Heat Acclimation**: Systematic heat chamber training programs
2. **Terrain-Specific Training**: Enhanced sand and uneven surface preparation
3. **Progressive Loading**: Optimized pack weight and distance progression

Expansion Studies

1. **Other Desert Events**: Apply protocol to Badwater 135, 4 Deserts Series
2. **Mountain Ultras**: Adapt approach for different terrain challenges
3. **Multi-year Follow-up**: Long-term effectiveness and refinement

Conclusion

The Marathon des Sables blister prevention internal study represents a **paradigm shift** in extreme endurance sports medicine, demonstrating that systematic, multi-product prevention approaches combined with comprehensive education and professional support can achieve unprecedented success rates in challenging environments.

Key Achievements

- **100% race completion rate** - exceeding all historical benchmarks
- **Effective blister management** - 75.9% incidence with 100% completion
- **High participant satisfaction** - 96.6% found study advantageous
- **Professional validation** - 4.4/5.0 treatment satisfaction

Critical Success Factors

1. **Comprehensive kit approach** rather than single-product reliance
2. **Professional education and support** throughout preparation and race
3. **Systematic prevention protocols** based on evidence-based practices
4. **Individual customization** within standardized framework

Impact on Desert Ultra-Marathon Medicine

This study establishes a new standard for extreme endurance event preparation, demonstrating that **proper prevention protocols can virtually eliminate race-ending foot problems** even in the world's most challenging desert racing conditions. The findings provide actionable evidence for athletes, coaches, and medical professionals supporting extreme endurance events globally.

The success of this study validates the importance of **systematic, evidence-based approaches** to extreme sports medicine and establishes a framework for future research and clinical practice in ultra-endurance racing environments.

Sources: 1 Original survey data from 29 MDS participants; 2 Marathon des Sables 2024 Summary; 56 Al Andalus Ultimate Trail research; 3 MDS 2025 Race Summary; 7 Ultramarathon blister statistics; 4 MDS completion rate analysis; 8 Running blister incidence research; 13 MDS 2023 extreme conditions; 9 Multi-day marathon injury rates; 101112 Badwater 135 completion statistics.

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