Susana Pica Montesinos.
Pediatric Nurse Specialist. Master's in Foundations for the Care and Education of People with Diabetes.
Master's in Nursing Research and Advanced Practice.
Educator in the Pediatric Unit of Hospital Universitario de Jerez de la Frontera.
Member of the Therapeutic Education Working Group of the SED

Care of Glucose Sensor and Insulin Pump Insertion Sites During Summer

Summer vacation is one of the most anticipated times of the year. The summer season invites us to rest, enjoy the outdoors, travel, and participate in recreational activities that promote physical and emotional well-being. Due to advancements in treatment and the use of technological devices, people with diabetes can now enjoy this season with greater freedom and safety. However, summer presents particular environmental conditions that require additional care.

Technology applied to diabetes is a great ally, allowing individuals with this condition to enjoy summer with greater freedom and safety. Glucose sensors and insulin pumps enable more precise and real-time management and monitoring of glucose levels. This reduces the risk of hypoor hyperglycemia during outdoor activities, travel, or water sports. **Therefore, these devices have a positive impact on metabolic control and quality of life (1-3), helping people with diabetes enjoy summer more fully and without limitations.**

Both glucose sensors and insulin pump infusion cannulas are inserted into subcutaneous tissue and held to the skin by adhesive tapes or pads. These are crucial for their proper function during the intended days of use. Despite the benefits of these systems, **skin reactions resulting from their application** (itching, pain, burning, bruising, bleeding, edema, scarring, wounds, infections, dermatitis, and related pigmentation issues) and premature detachment events in certain situations are significant problems. These issues can limit device use, **leading to a negative experience and increasing disease-related stress (4)**.

During summer, high temperatures, humidity, excessive sweating, and increased water exposure pose a challenge. These factors can interfere with the adhesive properties of the systems, leading to more frequent detachments of both sensors and infusion cannulas during this season, which requires more frequent replacements and the use of additional adhesive substances (5). This situation can promote the appearance of skin irritations, infections, or interference with the effectiveness of the systems. It's essential to follow protocols that minimize skin reactions yearround, but due to these circumstances, it's especially important during the summer period.

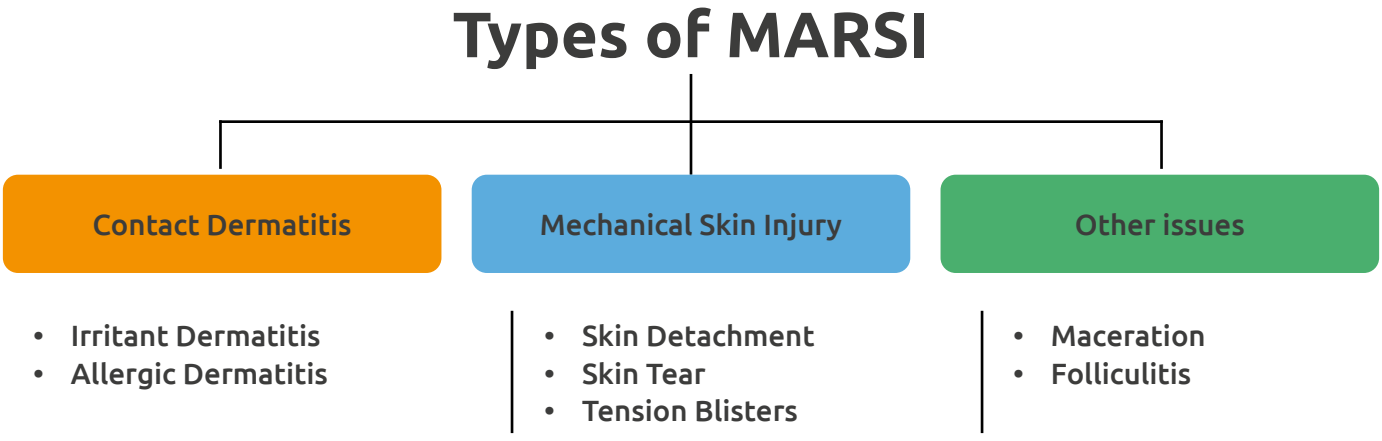
THE PROBLEM OF SKIN REACTIONS

Although skin problems due to the use of transdermal devices in diabetes treatment and monitoring are a common finding these days, they are often **underdiagnosed**. Their true prevalence is unknown because there are no specific registries or population studies. Most studies on diabetes technology prioritize glycemic control data and do not specifically address skin issues (6-7). A 2023 study with more than 800 people showed that **28% of sensor users and 29% of insulin pump users** experienced skin reactions. The most frequent reactions were local redness and itching, but 20% reported pain, and 12-15% presented vesicles and/or desquamation. Skin reactions led to discontinuing sensor use in 3.2% of individuals and insulin pump use in 2.1% (8).

REACTIONS TO ADHESIVES

One of the triggering factors for skin reactions is related to the adhesive used by different systems (5). Although scientific evidence for care recommendations and management of problems specifically related to diabetes device use is scarce (9), skin injuries caused by adhesives in healthcare in general, and in vulnerable populations in particular (neonates, premature infants, ostomy patients), have been studied. We have expert consensus recommendations that have been recently updated (10-11) and can be extrapolated. Medical adhesive related skin injury (MARSI) (10-11) is defined as a condition where redness (erythema) or other skin abnormalities (vesicles, blisters, erosions, tears, etc.) are observed, persisting for 30 minutes or more after removing a medical adhesive. Several types of injuries are described. Factors that predispose to their occurrence are related to:

- Individual characteristics that make them more vulnerable (extremes of age, personal history of skin problems, dry or macerated skin, un- »



SOURCE: Barton et al., Journal of Wound Ostomy & Continence Nursing 51(5S): S2-S8, 2024.

derlying pathologies, reduced mobility, malnutrition, dehydration, cognitive disorders, medication, etc.).

- Type of products used for skin cleaning and care before and after device removal.
- Type of adhesives used.
- Duration the adhesive must be in contact with the skin and repeated application.
- Placement and removal technique.

SPECIFIC SKIN PROBLEMS FROM DIABETES DEVICE USE

In the context of diabetes, **irritant contact dermatitis** (5, 9) is the most frequent presentation, and according to published evidence, it's caused by:

- Direct contact with irritating chemical substances present in the composition of devices/adhesives.
- Physical irritation due to repeated removal of adhesive materials.
- Accumulation of moisture under the systems.
- Reaction to the dressing per se causing a direct skin lesion.

Irritant dermatitis can promote the appearance of allergic dermatitis; the prolonged application time of devices adhered to the skin and the presence of sensitizing substances in them favor the process.

One of the triggering factors for these skin reactions is the chemical substances present in the composition of the devices and adhesives (5). Identifying sensitizing substances is crucial for preventing injuries. Although the situation has improved over time with the removal of identified allergenic substances like isobornyl acrylate (IBOA), other sensitizing agents continue to appear, such as rosin, rosin derivatives, butylated hydroxytoluene (BHT), N,N-dimethylacrylamide (DMAA), 1,6-hexanediol diacrylate (HDDA), dicyclohexylmethane-4,4'-diisocyanate (DMDI), etc. (5).

» The problem can be complicated because, often, people with diabetes, as part of their care routine, and on their own initiative or advised by health care professionals, use products that are not allergen-free, such as skin wipes for cleaning the insertion area, anesthetic ointments to reduce pain during placement, barrier dressings (liquids and solids) between the device and the skin to minimize contact, additional adhesives to reinforce system fixation, adhesive removers, etc. (5).

There's a lack of real knowledge about the chemical substances present in devices, adhesives, and auxiliary products used, highlighting the need for stricter and more rigorous regulation, such as complete and transparent labeling. Furthermore, both health care professionals and users themselves show a low level of awareness regarding the risk of sensitization to the components of these products. It's fundamental to adopt a preventive and diagnostic approach rom the initial stages, as well as establish referral protocols and agile procedures that allow for early detection and effective management of allergic contact dermatitis cases through relevant tests. Many skin reactions are self-reported and not evaluated by specialists, which underscores the urgency of more integrated dermatological care in the management of diabetes with technology (6-7).

MANAGEMENT OF SKIN INJURIES CAUSED BY ADHESIVE USE

Structured educational programs specific to starting device use, which include acquiring competencies for basic skin care (cleaning, proper placement and removal, and skin hydration and monitoring), have a positive impact on preventing and managing skin lesions (9,12).

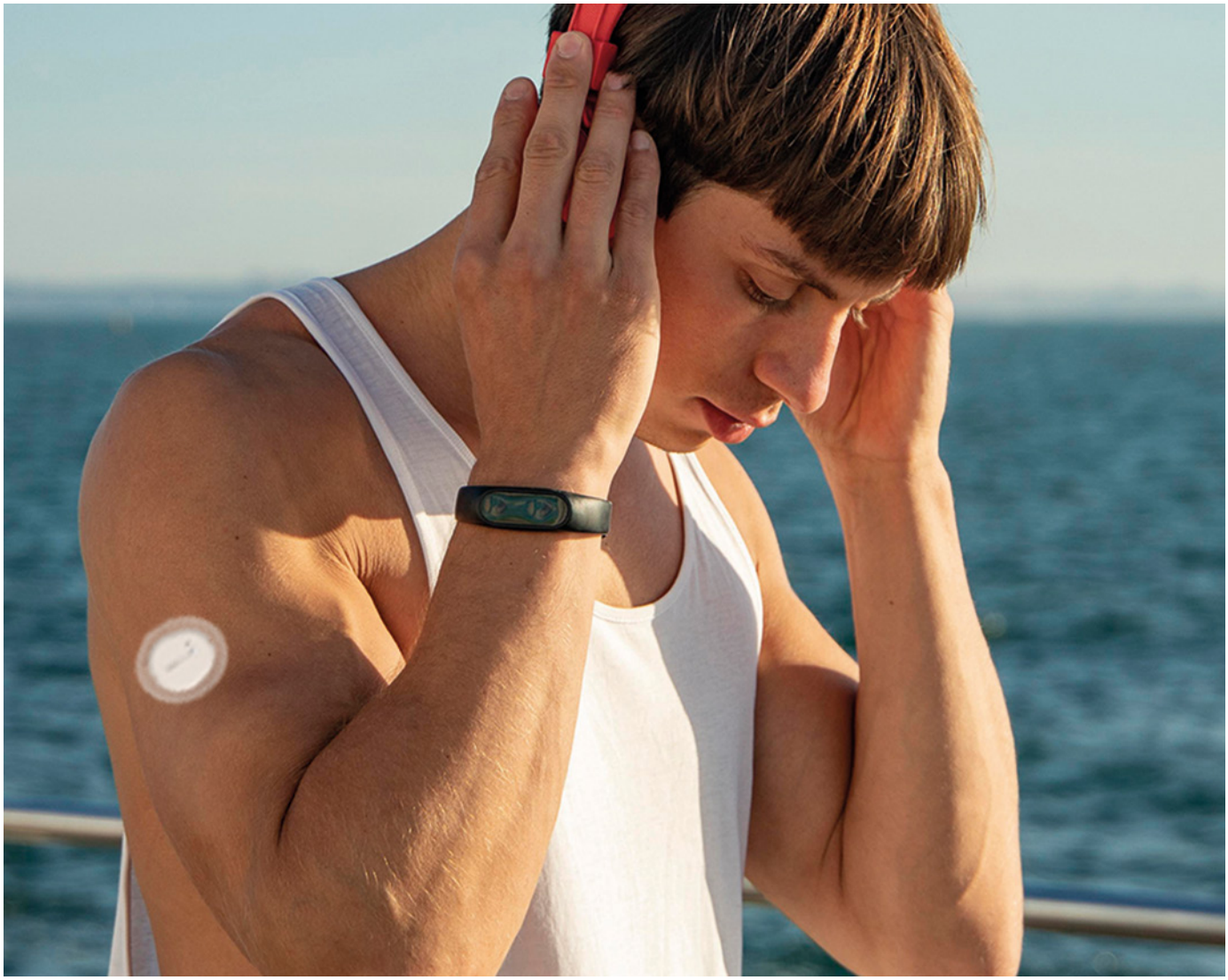
General recommendations for preventing skin lesions (11):

- Individualized assessment of each person and skin condition before and during the use of devices and additional products.
- Consider all device users as potentially at risk.
- Place the device on healthy skin, free of lesions, cuts, or irritations, and wait at least a week before reusing the same site. Trim hair if necessary.
- Wash skin with soap and water and make sure it is dry before inserting the device. Avoid using alcohol.
- On vulnerable skin, if skin protectors are used, let them dry completely. Preferably, they should be alcohol-free.
- Apply adhesives without forcing, pulling, or stretching, following manufacturer instructions.
- If additional adhesives are needed, choose the least aggressive one that provides necessary fixation.
- Limit the use of adhesive enhancers, and if necessary, take extreme precautions when removing them.
- Use barrier dressings between the device and the skin to avoid direct contact if necessary.
- Use corticosteroid spray before insertion and let it dry completely if there have been previous irritation episodes.
- Remove at a low angle, using both hands, parallel to the skin, in the direction of hair growth, and slowly while supporting the skin at the skin-adhesive interface.
- Use adhesive removers to facilitate removal.
- Use non-adhesive bandages for support if necessary.
- Don't leave the adhesive on longer than necessary and rotate sites to allow the skin to rest.
- Hydrate and care for the skin after removal to promote recovery.

RECOMMENDATIONS DURING SUMMER (11-13)

As discussed earlier, during summer, the risk of problems at insertion sites increases. Skin care is important year-round, but in these months, sweating, sunscreen use, swimming »

ALTHOUGH SKIN PROBLEMS DUE TO THE USE OF TRANSDERMAL DEVICES IN THE TREATMENT AND MONITORING OF DIABETES ARE COMMON TODAY, THEY ARE UNDERDIAGNOSED



» in pools and at the beach, water sports, etc., can weaken the adhesiveness of the systems. Therefore, it may be necessary to reinforce with additional adhesives to prevent detachment and the need for premature replacement. The use of these products and their subsequent removal from the skin, as well as more frequent system replacement, can favor the appearance of problems like contact dermatitis, mechanical injuries from tears or skin detachment when removing reinforcing adhesives, maceration due to humidity, infections, etc. Thus, closer monitoring of skin condition and appropriate, individualized guidelines are recommended.

Summer care for insertion sites focuses on (11-13):

1. Proper skin preparation: Wash the insertion area with water and neutral soap, dry completely. Avoid using alcohol.
2. Avoid using creams or oils.
3. On vulnerable skin, if skin protectors are used, let them dry completely. Preferably, they should be alcohol-free.
4. Proper rotation of insertion areas.
5. Daily monitoring: Check for signs of redness, pain, discharge, or device displacement.
6. If additional adhesives are needed, choose the least aggressive one that provides necessary fixation.
7. Limit the use of adhesive enhancers, and if necessary, take extreme precautions when removing them.
8. Removal with proper technique and use of adhesive removers if necessary.
9. Use of additional protective armbands or bandages. D

ADHESIVE ENHANCERS

Adhesive enhancers are applied before placing your device and come in liquid, spray, and wipe formats. Choose the solution individually, and for vulnerable skin, avoid those containing alcohol. Exercise extreme caution when removing them. Examples include:

- Liquid: Mastisol®
- Aerosol Spray: Nobecutan®, Fixband®, Tensospray
- Impregnated Wipes: Not just a patch™-SkinGlu, SkinTac Wipes®, Conveen Prep®

ADDITIONAL ADHESIVE BANDS

Dressings

- Not Just a Patch®: Features a central adhesive-free area to prevent direct contact with the sensor and is gentle on the skin.
- ExpressionMed® Sensitive Skin: A special variant for delicate skin, free of latex and irritants.
- GrifGrips® Ultra Soft: Offers soft cotton options, specifically designed for children and sensitive skin.
- Brava® Protective Sheet: Can be used for fixation on delicate skin in children and sensitive skin.

Adhesive Tapes

- Micropore™ (3M): A hypoallergenic and breathable paper tape; ideal for frequent use.
- Fixomull® stretch: Elastic and gentle on the skin, a good option for covering large areas.
- Leukoplast® Skin Sensitive: A tape specifically for fragile or sensitive skin.

High Resistance to Water, Sweat, and Exercise: Ideal for Athletes or Humid Climates

High-Resistance Dressings and Tapes:

- Skin Grip®: Designed to last up to 10 days, waterproof, and very adhesive.
- Simpatch® Waterproof: Strong adhesion and water resistance.
- Patchabetes®: Keeps the sensor secure even during intense activity or immersion.
- Opsite Flexifix® (Smith & Nephew): A transparent, highly water-resistant, and breathable adhesive film.
- Tegaderm™ Film (3M): Similar to Opsite; allows for safe showering and swimming.
- Durapore™ (3M): A silk tape with strong adhesive; a good option for additional fixation.

FINAL CONCLUSIONS

- The use of technological devices allows people with diabetes to enjoy summer with greater freedom and safety.
- Skin reactions from their application and premature detachment events can limit their use, leading to a negative experience and increased disease-related stress.
- It's essential to follow individualized protocols that minimize skin reactions year-round, and it's especially important during the summer season as environmental conditions can pose a challenge.
- Educational programs that include acquiring competencies for basic skin care play an important role in prevention and management.

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