Prevalence of waterproof dressing usage in aquatic therapy settings

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Why study waterproof dressings?

To Pool or not to Pool

Aquatic Physical Therapy Precautions and Contraindications
Purpose

• To review current practice of waterproof dressing use in aquatic therapy settings to describe prevalence, treatment procedures and outcomes to help guide future research.
Methods

• 10 Question
• Sent to
  • Members Aquatic PT Section, APTA via Waterlines newsletter
  • Participants of 2 US based CAPTCC courses
  • Participants of ICEBAT Mexico
  • WhatsApp – Global Aquatic Therapist
• Collected over 4 months
  • Oct 2016 to Feb 2016
Question # 1

Have you ever used waterproof dressings in your aquatic therapy practice?

n = 203

- Yes: 66.5%
- No (skip to question 9): 33.5%
Question # 2

How often have you used waterproof dressings over the last 12 months?

n= 138  (65 skipped question)

- Never: 8.0%
- 1 time: 13.0%
- 2-10 times: 52.2%
- 10-20 times: 13.0%
- more than 20 times: 13.8%
Question # 3

What reason/s do you use waterproof dressings? (check all that apply)

- Cover surgical incision: 58.4%
- Cover intestinal stoma (such as Colostomy, ileostomy): 16.1%
- Cover bladder stoma (such as ureostomy): 8.8%
- Cover stomach stoma (such as percutaneous endoscopic gastrostomy tube): 17.5%
- Cover central venous catheter: 9.5%
- Cover non-infected area of non-intact skin (not already mentioned): 67.2%
- Cover infected area of non-intact skin: 11.7%
- Cover non-infected area of non-intact skin: 13.9%
- Other (please specify): 0.0%

n=137
What type of dressing do you use to provide waterproof protection? (check all that apply)

- DuoDERM®: 8.8%
- OPSITE™: 22.6%
- Tegaderm™: 78.1%
- Other (please specify): 16.1%

n=137
Question #5

What skin preparation (if any) do you typically make before applying dressing? (check all that apply)

- No particular skin preparation: 57.4%
- Trim excess hair: 12.5%
- Wash with soap and allow to dry: 24.3%
- Apply product to improve adhesion of dressing (if yes, please elaborate in 'other' section): 14.7%
- Apply product to reduce skin irritation (if yes, please elaborate in 'other' section): 6.6%
- Other (please specify): 25.0%

n=136
Question # 6

Have you ever experienced waterproof failure with a dressing?

- Yes: 59.1%
- No (skip to question 9): 40.9%

n=137
Question # 7

Have you or your patient ever experienced complications from the waterproof failure?

n=99

- Yes: 7.1%
- No (skip to question 9): 92.9%
Question # 8

Q8 - Please indicate what type of complication. (check all that apply)  
n = 35  
(percentage calculated from n=135 of those who reported using waterproof dressings)
In what country do you live?
n=202

71.3% - United States of America
10.4% - India
4.5% - Mexico
2.0% - Brazil, Netherlands, Spain
1.5% - Switzerland
1.0% - Argentina, Australia, South Africa,
0.5% - Canada, Finland, Greece, Israel, Italy, United Kingdom of Great Britain and Northern Ireland, Venezuela
## Question # 10 - Comments

<table>
<thead>
<tr>
<th>Category of written comments</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person doesn’t work in an aquatic setting that had a need for waterproof dressing.</td>
<td>6</td>
</tr>
<tr>
<td>Interest of this topic and/or Support of more research on this topic</td>
<td>5</td>
</tr>
<tr>
<td>Cost and Availability of waterproof dressing is an issue</td>
<td>5</td>
</tr>
<tr>
<td>Concerns from referring physician or aquatic therapist about infection with open wounds in water even with waterproof dressing prevent them from using waterproof dressings.</td>
<td>5</td>
</tr>
<tr>
<td>Skin concerns with patients with delicate skin such as elderly or those sensitive to chlorine</td>
<td>4</td>
</tr>
<tr>
<td>Support successful use of waterproof dressing in their practice</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty with waterproofing certain joints such as knees, elbows, heels</td>
<td>2</td>
</tr>
<tr>
<td>Deep water or cardiovascular workouts tend to lead to increased waterproof failure</td>
<td>2</td>
</tr>
<tr>
<td>Recommend 1-2 hours between waterproof dressing application and immersion time.</td>
<td>2</td>
</tr>
<tr>
<td>Policy that patient needs to apply waterproof dressing</td>
<td>1</td>
</tr>
<tr>
<td>Report negative experience with waterproof dressings</td>
<td>1</td>
</tr>
<tr>
<td>Recommend specific product not already mentioned in survey (Smith and Nephew Skin Prep to improve adhesion and reduce skin irritation)</td>
<td>1</td>
</tr>
</tbody>
</table>
Waterproof success rate of transparent film dressing in aquatic therapy setting

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Purpose

• Waterproof success rate of transparent film dressings (Tegaderm and Opsite)
• With and without special skin preparation (Smith and Nephew Skin Prep)
• On elbow or knee joints of healthy subjects with intact skin
• After 2 hours of immersion with exercise
• In a 90F/ 32C pool
Prevalence of waterproof dressings in aquatic therapy

- Indicate need for waterproof dressing over non-intact skin if immersed in pool.
  - CDC states…
    - Person with open wound should stay of water unless covered by a waterproof bandage.
  - Aquatic Physical Therapy Section of the American Physical Therapy Association and
    - To Pool or not to Pool: Aquatic Physical Therapy Precautions and Contraindications.
Transparent film dressing = Waterproof Dressing?
More prevalence of waterproof dressings in aquatic therapy

- Prevalence of waterproof dressing usage in aquatic therapy settings: from an international online survey. (Dunlap, Gobert 2019)
  - 66.5% of aquatic therapist surveyed use waterproof dressings.
  - Most often used to cover non-infected wounds and surgical incisions.
  - Tegaderm and Opsite most common products used.
  - 57% do not use any special type of skin preparation.
  - 59% have experienced waterproof failure.
  - 7% report complication – most common was skin irritation.
Evidence on use of waterproof dressing in aquatic therapy.

- Bacterial contamination of bath-water from spinal cord lesioned patients with pressure ulcers exercising in water (Biering-Sørensen et al 2000)
  - 12 subjects -6 without and 6 with DuoDerm.
  - No significant difference in contamination of bath-water after exercise with or without DuoDerm covering the ulcers.
  - DuoDerm loosened in 50% of cases.
  - All exercise programs with or without DuoDerm contaminated with intestinal bacteria. (not bacteria from ulcers!).
  - Bacteria from intestine much more prominent than bacteria from ulcer.
More Evidence

• Early aquatic physical therapy improves function and does not increase risk of wound-related adverse events for adults after orthopedic surgery: a systematic review and meta-analysis. (Villalta, Peiris 2013)
  • Meta-analysis of 8 trials and 287 participants provided evidence that aquatic physical therapy did not increase the risk of wound related adverse events compared with land-based therapy

Early aquatic exercise = < 3 months post op
Closer look .... For waterproof dressing

2 studies cite use of waterproof dressings
• Rahmann (2009) – looked at aquatic therapy, strength, TKA, THA
  • Initiate aquatic post op day 4 and use waterproof dressing – unclear which product used, unclear if remained waterproof entire time.
• Harmer (2009) – looked at land vs aquatic therapy TKA
  • Initiate aquatic post op day 14, waterproof dressing was applied, unclear which product used, unclear if remained waterproof entire time.

Remaining 6 studies do not specifically mention use of waterproof dressing.
• Stockton and Mengersen (2009) TKA land PT 1 vs 2/day
  • Initiated aquatic post op day 4 (however- aquatic group observational only not included in statistical analysis)
• Jakovljevic and Vauhnik (2011) and Tovin et al (1994) aquatic rehab post of hip fx
  • Initiated aquatic day 14 (skin may be healed at this time)
• Brady et al (2008)
  • Initiated aquatic following surgical stich removal
• Zamarioli et al (2008)
  • Doesn’t specify when aquatic initiated (skin may be healed at this time)
• McAvoy (2009)
  • Initiated aquatic within 6 weeks. (skin may be healed at this time)
More Evidence

• Multicenter randomized controlled trial comparing early versus late aquatic therapy after total hip or knee arthroplasty (Liebs et al 2012)
  • Early aquatic PT = before surgical incision healed
  • Opsite applied 30 min prior to immersion. Did not indicate waterproof success rate
  • Adverse effects listed but not included in stat analysis
    • TKA – early (n=87): no wound related adverse effect.
    • TKA – late (n=98): no wound related adverse effect.
    • THA early (n=138): 1 wound related adverse effect
    • THA late (n=142): 1 wound related adverse effect.
Questions of this study

• What is the waterproof success rate when using transparent films on knee or elbow (Tegaderm and Opsite) after 2 hr immersion in 90F/32C pool?

• Can we improve the success rate with a specific application protocol?
Transparent film dressings

Semipermeable - selective filter

- Liquids, bacteria, viruses
- Water vapor, oxygen, carbon dioxide
What do manufacturers say?

3M – Tegaderm

“Tegaderm™ dressings are waterproof, patients may bathe, shower or swim, if the dressing is completely sealed around the catheter or wound.”

Smith and Nephew - Opsite

“OPSITE is resistant to water and body fluids, allowing the patient to bathe without changing dressings. It also aids in the prevention of bacterial contamination.”
Helpful tips from manufactures

• **Avoid stretching** of film during application as this can cause adhesion failure and skin trauma.
• Give at least 1 inch margin on healthy dry skin.
• Clip hair but do not shave (shave = microabrasions).
• Skin free of soaps, detergents, lotions.
• All preps and protectants to dry prior to application.
• Adhesive is pressure sensitive. Always apply firm pressure from center out to edges.
• For gentle removal – pull straight out if needed apply adhesive remover on fragile skin.
Liquid Skin Barrier

Protect fragile skin
+
 improve dressing adherence
What do manufactures say?

• 3M – Cavilon
  • Clinical Evidence (Campbell 2000)
    • Assisted in adhesion of dressing, prevented redness, maceration and skin stripping. No adverse effects.

• Smith and Nephew – Skin Prep
  • Improves film adhesion
  • Form protective film to reduce friction during removal of films.
Methods

• 64 trials of transparent film dressing applications

• Separated into 4 groups by joint
  • Knee with no special skin prep
  • Knee with Skin prep
  • Elbow with no special skin prep
  • Elbow with Skin prep

• The outcome of waterproof success rate was measured as lack of water penetration after immersion.
### Dressing Application – No skin prep

- Place gauze over pretend non-intact skin - either inside elbow or front of knee
- Place joint in correct position before application to avoid stretch at end ROM with exercise in pool (knee – full flexion, elbow – full extension)
- NO STRETCH of dressing during application
- Apply pressure from center out to edges
- Make sure 1 in border of adhesion all sides
- If wrinkles that will affect integrity when immersed or less than 1 inch border – apply another dressing over existing dressing

#### Dressing REMOVAL

Lift edge of dressing and grasp opposing edges then slowly stretch film until the adhesive gives way. Peel dressing from skin.

### Dressing Application – Skin prep

- Place gauze over pretend non-intact skin - either inside elbow or front of knee
- Apply skin prep (liquid film-forming barrier) over surrounding gauze – allow site to dry
- Place joint in correct position before application to avoid stretch at end ROM with exercise in pool (knee – full flexion, elbow – full extension)
- NO STRETCH of dressing during application
- Apply pressure from center out to edges
- Make sure 1 in border of adhesion all sides
- If wrinkles that will affect integrity when immersed or less than 1 inch border – apply another dressing over existing dressing

#### Dressing REMOVAL

Lift edge of dressing and grasp opposing edges then slowly stretch film until the adhesive gives way. Peel dressing from skin.

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**Position joint to reduce stretch on film upon activity in pool.**

**Do NOT stretch film when applying to skin**
Results

Waterproof success rate for transparent film dressing

- Knee or elbow
- Knee
- Elbow
Discussion

Tension

Compression
Next study
(data collected- writing up now)

Shorten immersion time to 1 hour and check 15 min intervals

Movable – knee joint
Non-moving – forearm

Same body for all applications (elbow, forearm with and without liquid adhesive).
WATERPROOF DRESSING APPLICATION

If wound is infected, deep, a surgical incision or on person with compromised immune system seek advice from health care professional if appropriate for immersion in pool with waterproof dressing.

If wound is covered with existing dry dressing keep in place and apply waterproof dressing on top. If wound is exposed assess the need for clean or sterile gauze over wound to prevent issues with waterproof dressing removal.

Select waterproof dressing that will allow at least 1 inch border of adhesion to skin surrounding the wound and any dry dressing.

If needed trim hair surrounding the wound at least .5 inch larger than the waterproof dressing size with hair trimmer.

Clean area surrounding the wound at least .5 inch larger than the waterproof dressing size. Allow to dry.

Apply skin preparation product surrounding the wound at least .5 inch larger than the waterproof dressing size to improve adhesion and/or reduce skin irritation. Allow site to dry.

If waterproof dressing will be applied over a moving joint position the joint prior to application to avoid stretch of the applied waterproof dressing during movement in pool.

Follow instructions on waterproof dressing to get dressing ready for application. Typically this involves removing liner to expose adhesive surface.

View the wound site through the film and place over center of the wound. NO STRETCH of waterproof dressing during application.

Apply pressure from center out to edges slowly smoothing the entire waterproof dressing for at least 30 sec.

Make sure at least 1 inch border of adhesion to skin surrounding the wound and any dry dressing.

If wrinkles in waterproof dressing that will affect integrity when immersed or less than 1 inch border – apply another dressing over existing dressing.

WATERPROOF DRESSING REMOVAL

Stabilize a center portion of the waterproof dressing then peel edge of waterproof dressing from skin in pattern horizontal and close to skin surface (NOT perpendicular and away from skin). Continue in this way working towards the center of the dressing.

With sensitive skin use adhesive remover product while removing dressing.

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Questions?

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