

Overcoming Skin Problems in Jejunostomy and Ileostomy by Using Hand-Made Skin Protector: Case Series

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The incidence of skin problems in jejunostomy or ileostomy is as high as 73-79%, higher than its incidence in colostomy (37%). A hand-made skin protector made of coconut shell can overcome the problem due to its convex shape, its ability to absorb water and its non-immunogenic material. There were six cases of ileostomy complications that could be handled successfully using the hand-made skin protector. Case-1: The peristomal skin irritation caused by the use of stoma bag without skin barrier. Case-2: Skin irritation because of the retracted ileal stoma. Case-3: Parastomal hernia. Case-4: Separated jejunostomy. Case-5: The problem of containing the ileal excreta. Case-6: Double skin barrier. The excreta, alkaline, coming out of jejunostomy or ileostomy contains active digestive enzymes. The exposure of the jejunal or ileal content to the skin can cause irritation and inflammation to the surrounding peristomal skin. The exudation caused by the inflammatory reaction on the skin makes the stoma bag difficult to be perfectly attached to the peristomal skin surface. The irritation and the pain caused by the leaking of ileal content decreases the patient's quality-of-life. The only suitable stoma bag should be convex-shaped and tightened to the peristomal skin using the traction from a belt around the waist. The innovation of a hand-made skin protector made of coconut shell is not only cheap but also very useful in preventing peristomal skin irritation, retracted stomal stump and parastomal hernia, whereas the adhesive-based plastic stoma bags commonly sold in the market can't solve those problems.

Keywords: *Hand-made Skin Protector; Ileostomy; Jejunostomy; Skin Irritation*

Introduction

The incidence of skin problems in jejunostomy or ileostomy is as high as 73-79%, different from that of in colostomy at 37% [1,2]. Excreta coming out of jejunostomy and ileostomy is light, alkaline, and contains active digestive enzymes, causing irritation to the skin. This differs from that coming out of colostomy, colostomy's excreta is more solid and less irritative [3]. The imperfect stoma bag attaching the peristomal skin causes leakage of the jejunal or ileac content to the surrounding area and causes irritation and inflammation on the surrounding skin. Therefore, the only suitable stoma bag should be a convex-type one [4]. The inflamed peristomal skin produces much exudate that'll make the stoma bag's wafer difficult to function as a skin barrier. The more excreta leaks to the surrounding skin, the more irritation occurs. The hand-made skin protector made of coconut shell taken from a ripe coconut can protect the peristomal skin from irritation. The coconut shell has specific characteristics such as being convex in shape, its ability to absorb water, its non-immunogenic material, that it is reusable, very cheap, and hand-made.

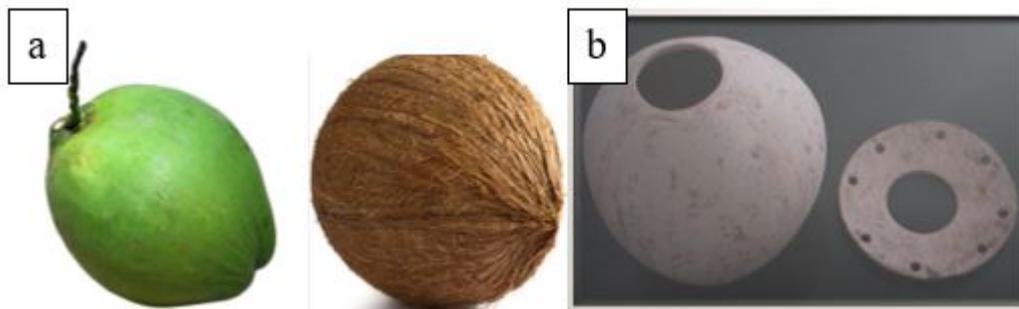


Figure 1. The intact ripe coconut fruit [a]. The natural convex shape of coconut shell, the size of the central hole can be made to adjust the size of the stomal stump (arrow) [b].

The skin protector needs to be attached to the plastic material of the stoma bag to avoid its direct contact with the peristomal skin for long time use to prevent skin irritation [1]. The intact ripe coconut fruit (Fig. 1a) is cut into a parabola shape to function as a skin protector. The central part of the shell is perforated according to the desired diameter to adjust the stomal stump's size (Fig. 1b). The hook made of ribbon fabric is attached to the holes at the edge of the coconut shell to be pulled by the waist belt (Fig. 2a). The plastic bag with a suitable size is affixed with glue onto the concave surface of the coconut shell as an excreta container (Fig. 2b). The mouth of the used beverage bottle along with its lid is used to drain the content from the bag without removing the bag and the waist belt (Fig. 2b,c). The coconut shell skin protector is reusable. After being used several times, the plastic bag will be detached from the coconut shell and could be changed by attaching a new plastic bag using glue.

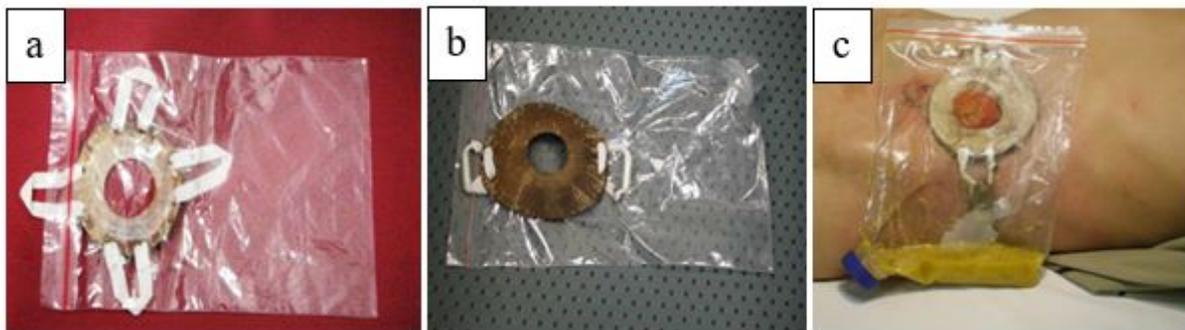


Figure 2. The ribbon-shaped fabric made as hooks to be pulled with a belt on the waist can be adjusted in the vertical or horizontal position, the plastic bag is affixed with glue on the concave surface of the coconut shell as an excreta container [a]. The mouth of the used plastic bottle along with its lid is affixed using glue for draining the content (arrow) [b]. The plastic bag contains excreta from jejunostomy [c].

Presentation of case

Case 1

A 55-year-old man suffered from septic peritonitis caused by the perforation of distal ileum and a double barrel ileostomy was performed (Fig. 3). The peristomal skin irritation occurred on the 7th day after surgery because of the leak of the excreta dealing with the use of a kind of stoma bag without skin barrier (wafer). The stoma bag with wafer can no longer be affixed to the skin because of the exudation produced from the inflammatory reaction on the skin. Even using powder and pasta, the wafer of the plastic stoma bag could not attach perfectly to the skin surface and the leak of excreta kept occurring and the skin irritation was worsening. The coconut shell skin protector-stoma bag was used, the leak of the excreta did not re-occur, and the skin irritation healed on the 8th day.



Figure 3. Double barrel ileostomy with peristomal skin irritation, 7 days after laparotomy.

Case 2

A 35-year-old woman suffered from septic generalised peritonitis caused by neglected caecal-diverticular perforation and right hemicolectomy and end ileostomy was performed. There was a retracted ileal stump (Fig. 4a) and severe skin irritation occurred 7 days after surgery (Fig. 4b). Several types of stoma bags with wafers on the market cannot be used to overcome this irritation problem because the exudation that occurs makes it difficult for the wafer to be stuck to the skin. The coconut shell skin protector was able to overcome the skin problem successfully and the skin irritation healed on the 15th day because of its natural convex shape and the ability to absorb fluid (Fig. 4c).



Figure 4. Retracted ileal stump causes severe skin irritation and much exudation, the 4th [a] and the 7th day [b] after surgery. It can be successfully overcome by coconut-shell skin protector on the 15th day [c].

Case 3

A 62-year-old man suffered from polyposis on his colon and rectum. Total colectomy up to the distal ileum and permanent end ileostomy were performed. Parastomal hernia (Fig. 5a) arose one year after surgery. The patient complained of a lump and pain in the peristomal area but hesitated to undergo a repair surgery. However, using a coconut shell stoma bag the patient felt comfortable and refused further repair surgery. The parastomal hernia has no longer disturbed him since the patient used the coconut shell stoma bag (Fig. 5b,c).

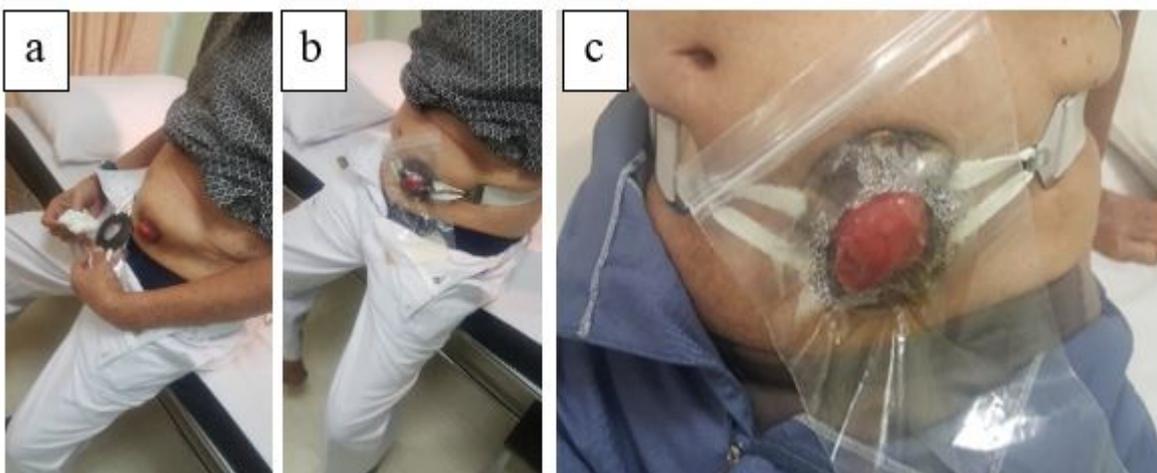


Figure 5. Parastomal hernia arose 1 year after surgery (arrow) [a]. The lump of the parastomal hernia was pushed inward by the traction of the coconut shell [b] and [c].

Case 4

An 18-year-old man suffered from septic jejunal perforation because of a traffic accident. A laparotomy and a separated double-barrel jejunostomy were performed. The proximal and distal stumps of jejunum were separated to enable the excreta to be put back into the distal stump. The product from the proximal jejunostomy stump containing incompletely digested material was stored in the coconut shell stoma bag and the excreta was put back into the distal part of jejunostomy through a catheter (Fig. 6a). The coconut shell skin protector in this case was very useful to protect the peristomal skin from irritation of the jejunal content which still contained active digestive enzymes, alkaline pH, and liquid excreta. The amount of jejunal product that came out of the proximal stump was so huge that it needed a special draining hole to repeatedly re-empty the product (Fig. 6a) and then it was put back into the distal stump using a catheter (Fig. 6a,b). In the first month after surgery, so much fluid production came out of the proximal jejunostomy stump that it needed emptying and putting back into the distal stump more than 10 times a day, and one month later it reduced to around 6 times a day due to the decreased amount of the production. This process could be done by the patient himself and the condition of the patient improved (Fig. 6b). The next surgery for closing the jejunostomy was performed 6 months later. As long as the patient used the stoma bag with the coconut shell skin protector, the peristomal skin was free from irritation and no pain was suffered, furthermore the quality of life of the patient was good.

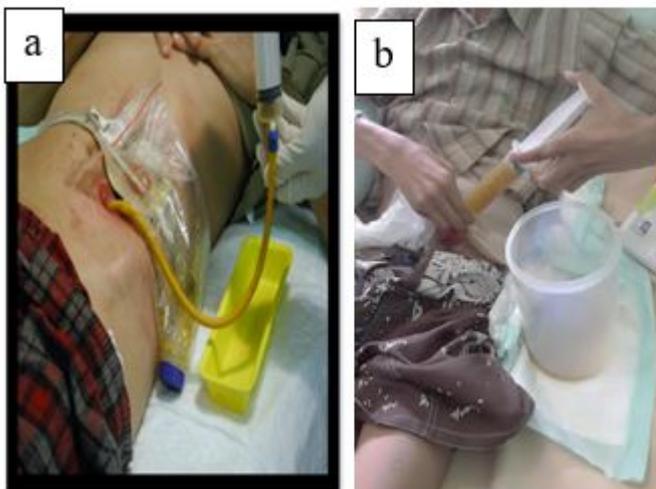


Figure 6. The container from plastic stoma bag with the coconut shell protector and a special draining hole along with the lid (arrow) [a]. The product from the proximal stump was put back into the distal stump of jejunostomy using a catheter, the patient did the process himself [b].

Case 5

A 30-year-old man suffered from septic peritonitis because of a car accident 2 days before. On surgery, we found a bucket-handled injury and necrosis on the proximal jejunum. We resected the necrosis part of the jejunum and a separate double-barrel jejunostomy was performed. The skin irritation occurred because the excreta from the proximal stump jejunostomy was so huge and the liquid leak always occurred although the patient used a commercial plastic stoma bag with wafer. The double skin barrier that was the wafer of the commercial stoma bag was attached to the concave surface of the coconut shell skin protector and pulled by the waist belt. By pushing the coconut shell against the peristomal skin due to the traction of the waist belt, the jejunal stump would protrude and no leak occurred anymore. The skin irritation and the pain subsided after the 5th day. The excreta coming out from the proximal jejunal stump was so huge and was drained into the plastic bag and the excreta was put back into the distal jejunal stump using a catheter (Fig. 7). The double coconut shell skin protector and the wafer of the commercial stoma bag worked together to make the proximal jejunal stump more protruding.



Figure 7. The 5th day of using double skin barrier: The wafer of the commercial stoma bag was attached to the concave surface of the coconut shell skin protector.

Case 6

A 12 year old village girl with retracted loop ileostomy, came to the hospital because of a painful peristomal skin irritation. The previous surgery was performed because of septic peritonitis due to the neglected mid-ileum perforation caused by abdominal trauma. Two more laparotomies were performed, the first was performed because of the leak of ileum anastomosis while the second was performed because of re-leakage of the same anastomosis. The ileum was not free enough to be brought outside as a loop ileostomy because of the strong adhesion of the intestines and resulted in retracted loop ileostomy. The stoma bag could no longer be attached to the irritated and inflamed peristomal skin. She used a self-modified used-plastic bottle as an

excreta container and held it in place by a kind of fabric rope around her waist. She could not sleep in a supine position for about 3 months because the content in the bottle would spill out on its side when the bottle was not in upright position (Fig. 8a,b,c). The problem of the painful skin irritation disappeared after she used the stoma bag with coconut shell skin protector (Fig. 8d). The patient was able to sleep again in supine position and the quality of life of the patient increased until the next ileostomy closure surgery. The surgery was performed 3 months later because of the socioeconomic problem of the family. The patient could not use the other type of stoma bags because the ileostomy stump was retracted and the huge exudation of the peristomal skin. The coconut shell was not only able to absorb the peristomal skin exudate, but it was also able to push the retracted stump protruded caused by the traction made by the waist belt.

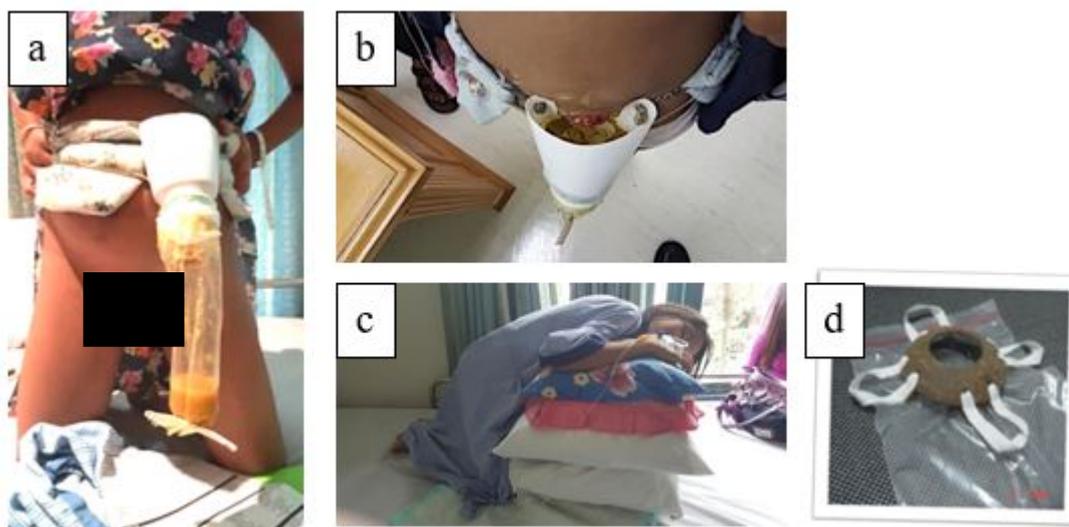


Figure 8. Self-modified used plastic bottle as an excreta container [a]. The bottle must be in upright position to avoid spilling out the content [b]. The patient should sleep in upright position [c]. Stoma bag with coconut shell skin barrier [d].

Discussion

Coconut shell can be used as a skin protector not only because of its natural parabola shape but also because it is non-immunogenic, porous and absorptive to water. The absorption capacity of coconut shell to water is 34.44 mg/cm² during the first hour, and cumulatively increases to 40.28 mg/cm², 45.02 mg/cm², and 48.09 mg/cm² on the second, the third, and the fourth hour respectively. After the 6th hour, the increase of water absorption slows, and then the absorption capacity will be fully saturated at 64.9 mg/cm² by the 20th hour (Fig. 9a) [3]. Therefore, we recommend using the coconut shell only for a maximum of 6 hours to obtain the optimal water absorption capacity, and then the patient should change it to the new one or replace 4 times in 24 hours. The coconut shell is very useful in absorbing the sweat or the spilled excreta on the peristomal skin [3]. Moreover, coconut shell has a convex parabola shape as its natural shape

(Fig. 1b). The convex surface headed to the skin and it can be pulled inward by the traction of the waist belt to make the stomal stump protrude (Fig. 3). In the case of parastomal hernia where the intestine protrudes through the parastomal fascial defect, the pressure made by the coconut shell protector is effective to withstand the intestine from protrusion.

The high absorption capacity of coconut shell skin protector is only for 6 hours, after 6 hours the absorption capacity will decrease until almost nil after 10 hours. The coconut shell stoma bag should be replaced by the new one after 6 hours [3]. The used coconut shell stoma bag is cleaned with common water and can be dried in sunlight or by oven so that it can be reused.

The data shows that drying full water-saturated coconut shells by means of unblocked sunlight between 9 am to 4 pm gives an average drying time of about 7 hours to restore the coconut shell to its original dryness (Fig. 9b) [3]. The drying time of liquid saturated coconut shells to complete drying condition under unblocked sunlight, at an ambient temperature of 30°C, and humidity of 70% RH (on the tropical zone) can be seen in Fig. 9b. By using an oven, the drying time is 58 minutes at 110°C, 36 minutes at 120°C, and 22 minutes at 130°C (Fig.9c) [3].

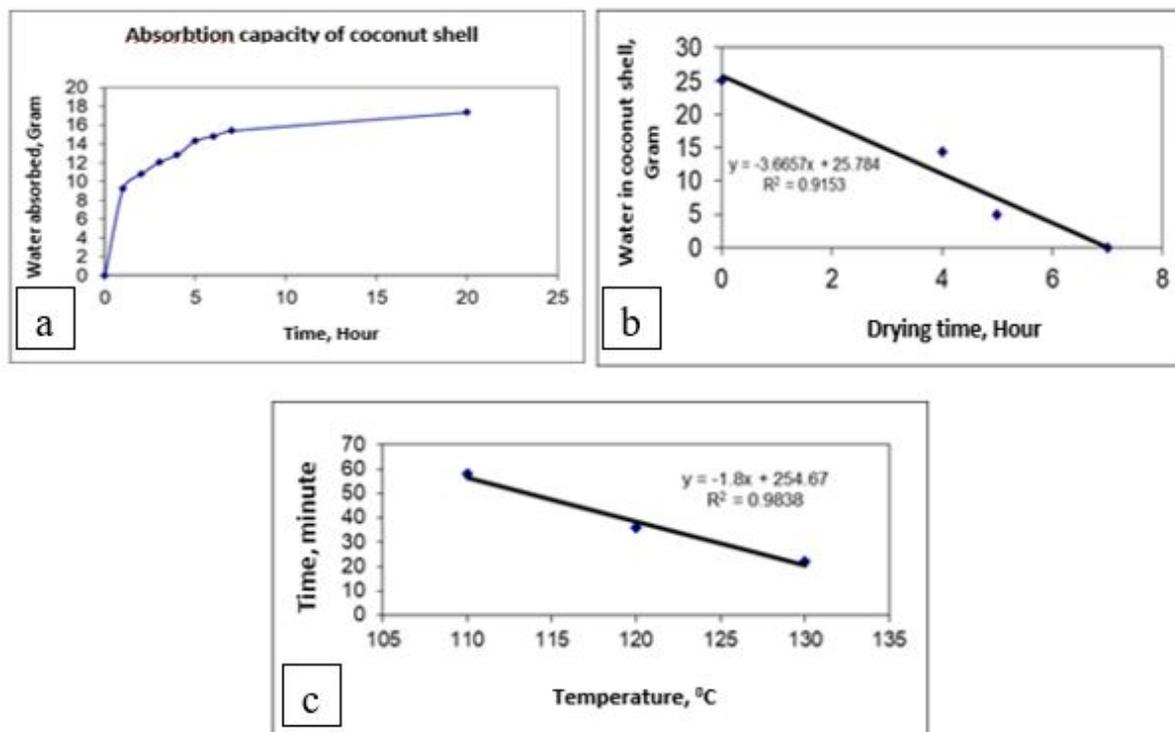


Figure 9. The absorption capacity of coconut shell to water decreases after 6 hours [a]. Drying coconut shells under the sunlight, at an ambient temperature of 30°C, and humidity of 70% RH in the tropical zone [b]. The drying time of liquid saturated coconut shell to complete drying condition using the oven is 58 minutes at 110°C, 36 minutes at 120°C, and 22 minutes at 130°C [c] [3].

We don't need pasta to attach the coconut shell onto the skin as the common stoma bags do, the coconut skin protector can stick firmly to the skin by the traction made by the waist belt. The adhesive that is usually used in the commercial skin barriers sometimes causes immunogenic reaction to the skin, therefore, we do not use adhesive in the coconut shell skin protector. The skin is always dry because the coconut shell has an ability to absorb the sweat and the spilled excreta on the skin surface. The characteristic of coconut shell is similar to that of karaya gum as the basic material of the wafer or flange of the skin barrier of the commercial plastic stoma bag. Both are derived from natural materials, the main compositions are carbon and lignin [3]. It has hydrophilic and non-immunogenic properties. The coconut shell is so hard and stiff, that it is impossible to release the carbon or lignin material to the skin surface, as the material of the plastic or its adhesive does. The parabola shaped material can also be made from other plastic material, it can be made mimicking the shape of the coconut shell skin protector, however, the plastic material has no absorption capacity and it can cause an immunogenic reaction to the skin surface [5]. The mono and polyethylene as the basic composition of plastic material or the adhesive can be released from the polyethylene chain of the plastic bag [6] and it can be absorbed by the already irritated skin surface and cause immunogenic reaction [5]. The irritated peristomal skin will lose its lipid protector layer and the small material that is released from the plastic sheet can be easily absorbed into the skin [5]. The weakness of coconut shell as skin protector is the material is so stiff that it cannot change in shape following the movement of the abdominal wall. The patients complained of discomfort in the beginning but later they felt comfortable after all the skin complications they previously had disappeared.

Conclusion

The hand-made skin protector made of coconut shell can overcome the skin complications of the intestinal stoma which are difficult to treat using other commercial stoma bags. The coconut shell has the ability to absorb liquid, the natural shape is convex and the material is non-immunogenic against the skin. The coconut shell skin protector is a very simple innovation, it can be self-made, is reusable, and very cheap.

Conflict of Interest: none

Funding: none

Author Contributions:

Vicky S. Budipramana: conception and design; analysis and interpretation of the data; drafting of the article; critical revision of the article for important intellectual content; final approval of the article



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