Convex stoma appliances: an audit of stoma care nurses

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ABSTRACT

This article observes the complexities surrounding the use of convex appliances within the specialist sphere of stoma care. It highlights some of the results taken from a small audit carried out with 24 stoma care nurses examining the general use of convex appliances and how usage of convex products has evolved, along with specialist stoma care practice.

Key words: Stoma ■ Ostomy ■ Nursing research ■ Quality of life

Nurses must deliver care based on the best available evidence or best practice (Nursing and Midwifery Council (NMC), 2015) and patients undergoing stoma formation require specialist nursing care to support both their physical and psychological needs (Porrett and McGrath, 2005; Borwell, 2009). With this is mind, it is essential that stoma care nurses (SCNs) provide evidenced-based stoma care. LoBiondo-Wood and Haber (2014) suggested nursing research, evidence-based practice and quality-improvement processes position the profession at the cutting edge of change and improvement in patients' outcomes.

The Association of Stoma Care Nurses (ASCN) has provided the stoma care specialism with some excellent standards of care to underpin practice and there are also clinical care pathways in stoma care that offer a framework for the delivery of high-quality care. However, it is apparent that the use of convex appliances within the specialist sphere of stoma care needs further focus with emphasis on evidence-based research. Unfortunately there is little documented work on the use of convex appliances, therefore, a small-scale audit was undertaken, with the prospect of undertaking a larger scale study in the future.

Stoma care was one of the very first areas of nursing to require a specialist nurse in 1971 (Elcoat, 1986) because of the complexities involved when caring for an individual with a stoma. As one of the first nurse specialisms it should be at the forefront of specialist nursing by setting standards and protocols that are appropriate, usable and regularly reviewed.

Various convex stoma appliances have been available for many years. Rolstad defined convexity as the outward curving of a stoma baseplate or flange that begins at the aperture of the baseplate and extends outward (Bourke et al, 2006). Convexivity can be categorised as shallow (1.58 mm or 1/16 inch), moderate (6.35 mm or 1/4 inch) or deep (greater than 6.35 mm or greater than 1/4 inch). A convex appliance is traditionally applied if a patient has experienced leaks from their stoma appliance due to an irregular peristomal skin surface, and only then after thorough and careful assessment by a qualified SCN. *Box 1* provides a summary of indications for convexity. An appropriate depth of product is then selected, however, even with an extensive range of products available, there is still no universal standard stipulating how an assessment should be made or specific product selected by the SCN.

Stoma care nurses in the UK originally used small plastic bevelled rings and inserted these into a two-piece base plate to create the simplest form of convexity when faced with a challenging stoma. Such products in clinical practice were not suitable for deep skin defects, as they created only a relatively subtle alteration to the stoma itself and surrounding skin contours. Therefore SCNs used a variety of pastes, seals and adhesive rings to attain a flat skin surface required to guarantee good adhesion of a stoma care appliance (Breckman, 1981; Elcoat, 1986; Cronin, 2008). Turnbull suggested:

> **'A convex system must provide enough pressure around the stoma to make a good seal deliver convexity directly at the base of the stoma with enough force to make it protrude and/or seal to the skin and be flexible enough to conform and seal to variable tissue profiles during postural changes.'**
>
> ***Turnbull 2003: 16-17***

Cronin, however, suggested that:

> **'The purpose of any convex product is to increase the protrusion of the stoma, so that it sits well above the surrounding skin surface and facilitates drainage of the effluent into the chamber of the bag.'**
>
> ***Cronin, 2008: 12***

In the early 1990s Hollister introduced the very first integral convex ostomy pouch: Impression C. This had an impact on stoma care nursing in the UK; it minimised appliance leakage and sore-skin issues reported by patients, as well as dramatically

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improving quality of life (Cronin, 2005). It simplified a complicated stoma management process for the patient, enabling them to manage their stoma confidently and independently.

The NMC *Code* states:

> **'Nurses must ensure that the advice we give is evidence-based if suggesting healthcare products or services.'**
>
> ***NMC, 2015: 7***

However, it is now more than 20 years since the first integral convex product (Impression C) was introduced into the UK market and SCNs have a myriad of choice within the range of integral stoma care appliances, from one- or two-piece systems to soft, hard, shallow or deep convex products.

The Wound, Ostomy and Continence Nurse Society (WOCNS) (2007) in the USA has published a best-practice document for patients which states that convex products may help the pouch stay on longer, stop urine or stool leakage from occurring, make the wearer feel more comfortable and secure, prevent or stop skin irritation caused by frequent leakage, and save time and money. Practice can vary from country to country, so some statements contained within this document are not necessarily applicable to the UK, however, it does state that initially any individual wishing to use a convex product should be reviewed by a qualified SCN. This is a recommendation echoed by the UK Patients, Industry and Professionals Forum (2014) stoma prescribing guidelines, which stipulate all patients should be assessed by a qualified SCN before being given a convex product.

The author has noticed a great deal of controversy regarding the selection of convex products, including how and when they are indicated. On reviewing the literature there are few reviews and texts that specifically discuss how the patient assessment should be undertaken and what SCNs should consider when attempting to find a solution for their patients when needing to use a convex product (Boyd et al, 2004; Bourke et al, 2006; Buckle, 2013; Hoeflok et al, 2013). All of the stated articles suggest that an abdominal assessment must be carried out to determine correct appliance and depth of convexity. All list indications and contraindications for convexity usage.

Boyd et al (2004), however, offered a far more comprehensive analysis of what information is required for a thorough nursing assessment (See *Box 2*). Despite this being a comprehensive clinical protocol regarding the use of convex products, expert opinion would suggest that it has not been widely accepted or used by SCNs, unlike integral convex appliances. It may be that the protocol was not widely marketed or publicised to practising SCNs after its introduction in 2004. Additionally, SCNs may have previously developed their own individual assessment protocol that they were content with, so that a universal guideline was not necessary. Nonetheless, integral convex appliances have been in existence for over 20 years and there is not yet a universal, professionally endorsed clinical guideline on convexity usage. Each convex product has manufacturers' instructions for use, usually accompanied with some initial patient assessment results highlighting how the product has been used previously, and potentially these guidelines are considered to be adequate. All protocols are slightly different and there is no consensus, as commented on by Hanley (2014), showing a need for further investigation of the topic.

Box 1. Indications for use of convexity and associated definitions

Indications for use	Definition
Flush stoma	Optimum length ileostomy is 2.5cm to help secure seal around base of stoma (Hampton and Bryant, 1992). Considered flush when level with abdominal skin
Retracted stoma	Stoma below skin level. Retraction may be partial or complete. Early cause can be technical difficulty at time of surgery or weight gain post-operatively (Lawson, 1993)
Peristomal skin creases or wrinkles	Skin creases can form channels along which leakage can occur and may only be present in certain positions (Myers, 1996)
Poorly sited stomas	Stomas formed during emergency surgery while the patient is supine or with a distended abdomen can result in stomas positioned in deep skin creases (Myers, 1996)
Telescoping stoma	Most commonly causes problems at night, as the stoma slides back to skin level when the patient lies down (Lawson, 1993)
High-output effluent	Output > 750 ml creates increased potential for leakage (Black, 2000)
Stoma opening at or near skin level	More likely to cause problems with leakage as effluent has to move up and over the layer between skin and appliance (Rolstad and Boarini, 1996)
Soft abdominal surface	Abdomen with poor muscle tone provides little support for stoma resulting in contours in the peristomal plane (Hampton and Bryant, 1992; Rolstad and Boarini, 1996; Wound, Ostomy and Continence Nurses Society, 2007)

Drolshagen et al (2014) highlighted some patient assessment guidelines for convexity that had been developed by a group of international specialist SCNs. These were subsequently discussed by Fulham in her presentation at the ASCN conference in 2014, and guidelines were to be disseminated within the UK shortly after that. However, no further reports to date can be found in the literature evaluating the effectiveness of the guidelines in clinical practice.

Since stoma care nursing practice and the appliances and accessories available to individual SCNs and their patients varies greatly from country to country, it makes practice quite difficult to correlate.

Aims and objectives of the audit

To establish a baseline of clinical practice and knowledge, and ascertain a true picture of current UK practice of convex appliance usage, a small audit was conducted by the author and a colleague, Caroline Redmond, in 2014 among a small group of SCNs working within the UK.

Method

Nurses were selected at random from an ostomy company database, some were based in an acute setting, while others were based within primary care. A short questionnaire containing a total of 26 questions was emailed to 24 SCNs and the response

ox 2. Nursing assessment for patients requiring convex products

	Suggested action	Rationale
atient's story	■ Obtain history of problem(s) from patient/carer ■ Take relevant medical history ■ Assess patient's general ability to manage stoma care	■ To develop an understanding of problem(s) with leakage and usual wearing time of appliance (Elcoat, 1986) ■ To understand any predisposing factors ■ To ensure the most suitable appliance is selected for the patient to promote independence (Black, 2000)
toma ssessment	■ Observe stoma type, colour, shape, size and consistency of output ■ Assess individual stoma function ■ Inspect baseplate of appliance removed	■ To build a picture of possible causes of leakage problem and to obtain the correct size of stoma to select suitable appliance (Lavery and Erwin-Toth, 1993). The stoma size and contours of peristomal skin can change with time (Metcalf, 2001) ■ To observe the degree of stoma protrusion and the point at which the stoma empties (Hampton and Bryant, 1992) ■ This can reveal tracks of leakage or weaknesses in seal of baseplate (Myers, 1996)
bdominal ssessment	■ Observe peristomal skin condition and inspect and palpate abdominal contours ■ Observe stoma in sitting, lying and standing positions ■ Observe abdominal muscle tone and skin turgor ■ Document findings	■ To identify any skin problems and to develop an impression of the peristomal field and its contours (Hampton and Bryant, 1992) ■ To reveal hidden creases and changes in contours of peristomal skin (Myers, 1996) ■ Abdominal muscle tone can be soft, moderate or firm and can be an indicator if additional support is needed. A soft abdomen will lack muscle tone to support the stoma (Rolstad and Boarini, 1996) ■ To provide evidence of assessment

ource: Boyd et al, 2004

able 1. Responses to question 1 'What criteria do you use when ssessing for the use of convexity?'

esponse	Number of responses	%
epth of retraction	13	100%
ondition of stoma	11	85%
arastomal skin condition	9	65%
me since surgery	6	46%
MI	3	23%
rug history	3	23%
ucocutaneous separation	10	77%
resence of oedema	5	38%
resence of infection	5	38%
roximity of drains, incisions etc	5	38%

rate was 13 (54%). The SCNs were asked a variety of questions relating to their own clinical practice and were asked to tick the box or number of boxes that were relevant to them. All responses were anonymous. The questionnaire was designed by two experienced SCNs and reviewed by several other non-nursing colleagues to determine readability and understanding.

Results

The author has chosen to report on 7 questions from a total of 26 that were given to the sample SCNs due to the limitations of this article. The questions and responses are reported in *Tables 1-7*.

One question asked in the audit was how soon an individual SCN would apply a convex product and what type of convex stoma product would be deemed appropriate.

Some of the other comments included when answering this question included:

- 'Start on soft and increase as necessary'
- 'Always try soft convex first'
- 'Rarely have to use hard convexity, however if all other options have been tried and failed'
- 'Start on soft and if needed try soft and washer and then hard/deep convex.'

Some additional comments from the SCNs in the audit included 'observe for any tension of the abdominal wall', 'observe the leakage pattern (on the previously worn flange)', and 'identify all abdominal contours'.

Discussion

The majority of SCNs audited would opt for a soft convex product (77%; 10/13) following initial stoma assessment, 38% of those audited would assess on the level of retraction. The audit suggests that the majority of SCNs in the UK do opt for a soft convex appliance in the first instance when any patient begins to experience issues with leakage as a result of a poorly formed stoma. Buckle (2013) suggested that soft convexity will not alter protrusion and creates minimal tension/pressure on the skin. Nonetheless, if a soft convex product effectively maintains leak-free status for a significant number of patients, the aim of the product has been met and it has also played a part in improving quality of life.

Responses to question 2 (*Table 2*) indicate that the majority of respondents would apply a soft convex product if a patient was struggling to keep an appliance in situ for more than a few hours. *Table 5* highlights that 77% of SCNs reported that deep convexity is rarely used within their current clinical practice and just 22% reported its occasional use.

Interestingly when asked what the SCN would do if the soft convex product fails (*Table 6*) the majority of SCNs (77%) would try a soft convex appliance with a belt or some paste or a seal, 46% would try an alternative soft convex product, 30% suggested trying a shallow convex, 15% suggesting a medium convex, but only 8% suggested a harder, more rigid deep convex appliance. This appears to suggest that SCNs would reassess and consider increasing the depth and rigidity of the convex product in gradual steps, but only after all avenues of using a variety of soft convex appliances have been expended.

According to UK data from IMS Health (which sells data and reports to global pharmaceutical and biotechnology companies) in 2013 70% of total sales for one-piece convex ostomy pouches were hard convex versus just 30% soft convex; however, 2015

ata highlighted this has shifted in favour of one-piece soft onvex, where sales have increased to 45% of total convex les for one-piece versus 55% for hard convex). This would iggest that there is a growing trend in favour of using a soft-onvex product.

In the author's experience, many SCNs advocate the use of seal or washer underneath a soft convex product, which does ave its place if used appropriately and its usage is reviewed egularly. This should not be confused with accumulative eristomal pressure (APP) as described by Cronin (2008), who lentified that applying a seal or washer under a deep convex ppliance with a hard inflexible ring exerts an intensive constant ressure around the stomal plane, which can cause a double-epth skin trauma. This presents as two marked peristomal ircles following removal of the appliance. Long-term and nappropriate use of deeper/hard convex could be potentially letrimental (Cronin, 2008) and Hanley (2014) reported that ome patients experienced issues associated with prolapsed tomas that she attributed to continual unmonitored convexity isage. This raises the question of whether patients using harder/igid convexity should be reviewed regularly to prevent problems rising in the future. The ASCN quality standard 6 (2013) states hat stoma-care reviews should be undertaken as appropriate for atients. In line with this, patients wearing a deep/hard convex ppliance should be reviewed regularly if they are not so already y their local SCN. Results of the audit suggest that in current linical practice there appears to be a myriad of appropriate ollow-up regimes and although there is an ASCN guideline or SCNs to follow, it would appear that each individual SCN/ entre adheres to a local protocol.

Protocols and policies are often seen to drive good clinical practice, however, each patient must be reviewed holistically and occasionally an informed, clinical decision needs to be made that encompasses individual patient assessment and the clinical situation, rather than rigid protocol. For example, peristomal pyoderma gangrenosum (PPG) is a skin condition associated with inflammatory bowel disease, and can result in painful ulcers with a blue-tinged edge. Rolstad and Boarini (1996) and Boyd et al (2004) highlighted that convexity should be used with caution in the presence of PPG, however, Coakes reported at the 2015 ASCN conference that the use of hard, deep convex products actually maintained an adequate seal and consequently improved quality of life for a patient diagnosed with PPG. The patient was reviewed regularly and the PPG healed, suggesting that it is sometimes difficult to adhere rigidly to protocols.

Davenport (2014) reported a small audit of 16 SCNs that showed the follow-up pattern to review stoma-care patients within the first 12 months post-surgery varied from 1 to 10 visits. This supports the data from the current audit that there is no accepted standard and each patient is assessed and an individualised plan of care is initiated following thorough assessment of physical, psychological and social issues and visits planned accordingly with the understanding that the plan of care may need to be altered after each re-assessment visit. A previous study by Pringle and Swan (2001) highlighted that only 33% of patients had completely resumed their social activities 1 year after stoma formation, which supports the view that visits at 6 months and 1 year can be beneficial to identify any issues and initiate interventions if warranted.

In 2013 the ASCN published stoma care nursing standards and an audit tool. Quality statement number 7 is: 'Long-term/lifetime specialist SCN support'. It advocates that people living with a stoma should have continued access to a SCN, and is fairly open to interpretation on how that follow-up is conducted.

Table 2. Responses to question 2 'How soon after surgery would you apply convexity?'

Length of time	What type of convexity
ASAP	Soft
Approximately 4 days	Soft
As soon as I know no other pouch and seal would work	Softest
Straight away	Soft
One to two weeks	Very soft convex/flat bag with seal
Possibly 2 days? Very individual depending on the patient	Always start on the softest necessary to obtain seal
Straight away if needed	Soft only
Twelve hours	Soft convex
Forty-eight hours	Very soft
Next day	Soft
Depends on stoma type, after all else has failed no definitve time	Softest first
Seven days?	Depends if stoma is non-existent, 'button-in-a-cushion' depth, depending on type of stoma
Depends when stoma begins to activate	Soft

Table 3. Responses to question 3 'How have you acquired the 'know-how' with regards to using convex products?'

Response	Number of responses	%
Hands-on experience	13	100
Other nurses	10	77
Formal course	4	31
Sales representatives	8	62
Reading articles/information on convexity	8	62
Other; please give details	0	0

Table 4. Responses to question 4 'How do you assess depth of convexity required?'

Response	Number of responses	%
On the level of retraction	5	38
Opt for soft convex	10	77
Other; please give details	7	54

Table 5. Responses to question 5 'How often do you use deep convexity?'

Response	Number of responses	%
Always	0	0%
Occasionally	3	23%
Rarely	10	77%
Never	0	0%

Table 6. Responses to question 6 'If soft convexity fails, what would you then progress onto?'

Response	Number of responses	%
Soft convex with a belt	10	77%
Shallow more rigid convex	3	30%
Medium convex	2	15%
Harder, more rigid, deep convex product	1	8%
Other - please give details	6	46%

Table 7. Responses to question 7 'How often do you think patients using convexity should be reassessed?'

Six-monthly
Weekly if newly formed then monthly, then every 3 months.
Weekly, if newly formed then monthly, then 3 monthly. Would make patient aware to contact me if any concerns
Can't answer that question as every patient is different
Weekly for 4 weeks, monthly, then every 3 months
Three-monthly when settled
No formal planned reassessment but often see patients monthly for a few months in first year then as required by patient
Weekly at first for a month then if no problems 6-monthly
Initially on a regular basis while the stoma is settling down then 6 monthly
Monthly. My patients are assessed initially to make sure all working well and patients are told what to look out for and to ring
Three-monthly initially. Longer they have the stoma the more likely they would be aware of changes to their stoma and would consider contacting you should this change

This allows each SCN to make a professional, individualised assessment of their patient and follow-up in a timely fashion appropriate to specific situations.

Interestingly, although the UK has a large and growing soft convex appliance usage, which is partly proven by this audit, its usage is not so widespread in all countries. Soft convex products are not widely commercially available in North America, so therefore the usage in minimal. Perhaps this is related to cost and the need to prolong patient weartime in the USA and Canada, as many individuals living with a stoma are required to self-fund and ostomy products can prove expensive. In the UK stoma care products are funded by NHS if a patient has a permanent stoma.

Limitations

The number of SCNs who contributed to this audit is only a small percentage of the total SCNs practising within the UK, however, it certainly begins to explore the complexities of convexity usage. In the audit a total of 26 questions were asked to the SCN's, however, due to the limitations of this article only seven questions are being reported. The audit questions were designed by two experienced SCNs and a pilot study was not thought to be necessary. On reflection perhaps this small audit could serve as a pilot study for a larger national study to review the UK's SCN practice on convexity usage. It would appear that the use of convexity is complex, so perhaps this is why there is so little evidence available in the literature.

Conclusion

There has been much discussion about protocols, guidelines and generic guidance for using a convex appliance, but as this small audit has highlighted, there are many variables that can impact on clinical decisions that professional SCNs make. It is clear that using any form of convexity in the appropriate clinical situations undoubtedly does improve the quality of life for many patients. The everyday use of soft convexity now appears to be firmly embedded into UK stoma-care nursing practice, however, further evidence is required, conceivably as a large national audit facilitated by a leading professional body. **BJN**

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KEY POINTS

- A thorough patient assessment is required by a qualified stoma care nurse before a convex product is recommended
- Soft convex products can reduce appliance leakage and sore skin issues for patients
- There are different levels of convexity appliances currently available that can be utilised in clinical stoma care practice
- More research is needed in the appropriate follow up and implications for long term convexity usage