

SSWAHS EBP Summary Sheet

PART A – SEARCHING THE EVIDENCE

1. Date Commenced: 2003

2. EBP Question

Is elastic bandaging or stump shrinkers more effective in reducing residual limb volume in amputations of the lower limb?

3. Group Addressing the Question:

Names: Clementia Yuen, Kim Stendara, MyKim Tu, Nicole Ryan, Amy Jakowlew

Hospital: Braeside Hospital

Area of Physiotherapy Department: Rehabilitation

4. Why Was Question Addressed?

Braeside Hospital provides prosthetic services for below and above knee amputees and hence it is important that there are recommended guidelines regarding the most appropriate method for oedema management.

Management of stump oedema in amputees is an important component in prosthetic rehabilitation. Poor stump oedema control will delay the use of a prosthesis and hence affect the patient's level of activity and independence. Secondary complications from this would include development of contractures and weakness due to reduced mobility. Reduction of stump oedema also affects healing of the wound.

5. Is there a 'clinical practice guideline' already available relevant to your question?

No

6. Strategy Used to Search for Evidence

Databases searched	Search Strategy (key words)	Time taken to search database	Number of articles/reviews found			
			RC T	SR	CP G	NC T
Cochrane Pedro Medline Embase Cinahl EBM reviews Contacts at APC and Lee Brentnall (physio in Melbourne doing research on topic)	Stump shrinkers, stump bandages, amputees, physiotherapy/physical therapy, rehabilitation, below knee amputation	3 hours combined	1 2	1	2	

(RCT= Randomised Controlled Trial, SR= Systematic Review, CPG= Clinical Practice Guideline, CT= Non-Controlled Trial)

7. Reference List of Articles Retrieved from Search

1. Unna and elastic post op dressings: Comparison of their effects on function of adults with amputations and vascular disease. Wong & Edelstein. Archives of Physical Medicine and Rehabilitation. Volume 81, September 2000, pages: 1191 – 1198.
2. Comparison of removable rigid dressings and elastic bandages in preprosthetic management of patients with below knee amputations. Mueller. Physical Therapy. Volume 62 (10), October 1982, pages: 1438 – 1441.
3. Pressure measurements beneath below-knee amputation stump bandages: Elastic bandaging, the Puddifoot dressing and a pneumatic bandaging technique compared. Isherwood, Robertson & Rossi. British Journal of Surgery. Volume 62, 1975, pages: 982 – 986.
4. Postoperative dressing and management strategies for transtibial amputations: A critical review. Smith, Lynne, Farland, Sangeorzan, Gayle, Reiber & Czerniecki. Journal of Rehabilitation Research and Development. Volume 40 (3), May/June 2003, pages: 213 – 224.
5. Comparing the effectiveness of elastic bandages and shrinker socks for lower extremity amputees. Manella. Physical Therapy. Volume 61 (3), March 1981, pages:334 – 337.
6. Use of removable rigid dressings for transtibial amputee rehabilitation: A Greenwich Hospital experience. Hughes, Ni & Wilson. Australian Physiotherapy, Volume 44 (2), 1998, pages: 135 – 137.

8. Please attach worksheets of relevant information:

WORKSHEET FOR SYSTEMATIC REVIEWS

Title: Postoperative Dressing and management strategies for Transtibial Amputations; A Critical Revue.

Authors: Douglas G Smith, Lynne V McFarland, Bruce J Sangeorzan, Gayle E Reiber, Joseph M Czernecki

Journal & Date: Journal of Rehabilitation Research and Development. Vol.40 No 3 May/June 2003. Pages 213 - 224

Purpose of systematic review	Revue of published literature regarding most effective postoperative management of transtibial amputation comparing safety, efficacy and clinical outcomes of treatment.
Methods, how did they find the relevant trials?	Electronic searches of Pubmed 1960 – March 2002 and Index medica via medline 1960 – March 2002. Reference lists taken from articles, reviews and books. Personal communication and content experts.
Methods, how did they assess their individual validity?	Authors had difficulty defining “end point” as the literature found used different criteria, making it impossible to directly compare one article with another.. There is no description of assessment of individual validity.
Results, what were the results, were they consistent from study to study?	Results were not consistent between articles due to difficulty defining “end point”, however results of controlled studies show significant differences in clinical outcomes by dressing type. The studies do not give evidence to support decisions re when to fit prosthesis, when to cast a patient or when to weight bear.
Do these results apply to your patient group?	yes
Conclusion	Studies to date do not answer the questions of best post op dressing, when to fit a cast, when to weight bear for the first time. Further controlled randomised studies are needed.

Clinical Implications	From analysis documented in systematic review there is no evidence to change current practice at Braeside.
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(To be completed for each article reviewed. Cut and paste additional worksheets as needed)

WORKSHEET FOR CLINICAL TRIALS

Title: Comparing the effectiveness of elastic bandages and shrinker socks for lower extremity amputees

Authors: Marella, Kathleen

Journal & Date: Physical Therapy Vol 61 (3) March 1981, pages 334 - 337

Purpose of study	To compare effectiveness of bandaging versus shrinker socks in reducing residual limb volume
Design of study, score on Pedro rating scale	Randomised controlled trial Pedro Score – 6/11
Subjects, inclusion, exclusion criteria Details, age, source. Is this group similar to your clients?	Inclusion – well healed incision, score of 9/10 for proper wrapping technique, availability for weekly measures for 4 weeks, not > 2.25 kg of weight change over a 4 week period. 12 BKA in trial with mean age of 56, diabetes and vascular insufficiency which is similar to Braeside clients
Intervention for experimental group Nature, Intensity	6 patients used elastic shrinker socks that extended above the knee. Instructed on how to apply sock. Reapply dressing at least every 4 hrs for 4 weeks.
Control Group, what intervention did they receive?	6 patients used elastic bandages above the knee. Instructed on technique using 10 point rating scale. Reapply dressing at least every 4 hrs for 4 weeks.
Measures	Segmental limb volume. $Volume = h/12 \times [c_1^2 + c_2^2 + (C_1) (C_2)]$ Circumferential measures with patient in sitting with knee flexed to 90 degrees.
Results <i>(Include 95% confidence intervals and consider CLINICAL significance of results)</i>	Average change weeks 1 – 4: Shrinker sock group (mean +/- SEM vol) = -63.6 +/- 38.1 Bandage group = + 16.5 +/- 50.8 Increase volume for bandaging and decreased

	volume for shrinkers (p = 0.08). Comparing 2 averages, the shrinker method produced significantly larger decreases in volume (p = 0.03).
Conclusion Is the intervention worthwhile, consider the size of the effect and the intensity of the intervention	Shrinkers appear to be more effective in reducing limb volume. However, need longer term follow up, larger sample size and ? what was compliance levels for reapplication of dressing every 4 hrs.
Clinical Implications	For BKAs multiple limitations to elastic bandaging. Is most likely easier and more effective in using stump shrinkers instead.

WORKSHEET FOR CLINICAL TRIALS

Title: Unna and Elastic Post-operative Dressings: Comparison of their Effects on Function of Adults with Amputation and Vascular Disease.

Authors: Christopher Kevin Wong, Joan E.Edelstein

Journal & Date: Arch Phys Med Rehabil Vol 81, Sept 2000

Purpose of study	To compare the functional outcome associated with use of Unna semi-rigid dressings and elastic bandage soft dressings for adults with lower limb amputation
Design of study, score on Pedro rating scale	Experimental design
Subjects, inclusion, exclusion criteria Details, age, source. Is this group similar to your clients?	Lower limb amputation patients with vascular disease. All patients admitted to inpatient rehab ward within 30 days of surgery screened. Excluded if patient had infectious cellular culture or fever or non-viable amputation limb.
Intervention for experimental group Nature, Intensity	Subjects in the semi-rigid dressing group had Unna dressing applied to amputated limb by physical therapists trained in the technique.
Control Group, what intervention did they receive?	Control group had elastic bandaging by therapists, nurses, family and themselves, all trained in the technique.
Measures	Length of stay- time for patient to achieve ambulating with prosthesis for discharge. Readiness for prosthesis fitting measured also (surgery time -> fitting time) FIM
Results	67% of semi-rigid dressing group and 20% in elastic dressing group discharged from rehab walking with prosthesis. 20.8 days for SRD group and 28.7 days for ED

	group to be fitted with prosthesis. 30% of SRD fitted within 34 days and 64 days for same percentage in the ED group to be fitted.
Conclusion Is the intervention worthwhile, consider the size of the effect and the intensity of the intervention	Unna semi-rigid dressings are more effective in fostering amputation limb wound healing and preparing for fitting. Patients treated with SRD's more likely to be fitted with prosthesis and return home walking with prosthesis.
Clinical Implications	We do not use semi rigid dressings here but we do incorporate stump shrinkers and elastic bandages. The evidence indicates that it is better to use stump shrinkers than bandaging (elastic) for oedema control.

WORKSHEET FOR CLINICAL TRIALS

Title: Use of removable rigid dressings for transtibial amputees rehabilitation: A Greenwich Hospital experience.

Authors: S. Hughes, S.Ni and S. Wilson.

Journal & Date: Australian Journal of Physiotherapy. 1998, No 2, Volume 44, pages135-137.

Purpose of study	Description of new technique- Removable rigid dressing.
Design of study, score on Pedro rating scale	Description of problems with elastic bandages and stump shrinkers. Discussion regarding their implementation of RRD and documentation of changes in their length of stay and time to fitting of prosthesis. Pedro scale= 0
Subjects, inclusion, exclusion criteria Details, age, source. Is this group similar to your clients?	Inpatient Amputee Rehabilitation program. Patients excluded if patient cannot co-operate with rehabilitation program because of cognitive impairment or active stump infection.
Intervention for experimental group Nature, Intensity	Removable Rigid Dressing – intensity not stated. Assumption of wearing the RRD on all waking hours.
Control Group, what intervention did they receive?	Nil- no control group.
Measures	- Average length of stay.

	- Average time to fitting of definite prosthesis.
Results	Length of stay- Unilateral BKA was 80days in '91 → 36days in '95. Time to fitting- 101days '93 → 46 days '98. Incidence of stump injury- 22% in '90 → 05 within 1 year of using the RRD.
Conclusion Is the intervention worthwhile, consider the size of the effect and the intensity of the intervention	Due to nature of article, provides no appropriate evidence to reach a valid conclusion → need more RCT's.
Clinical Implications	Article states difficulties with elastic bandages and stump shrinker socks – similar to that experienced at Braeside. Liase with prosthetists re: use of RRD with patients.

WORKSHEET FOR CLINICAL TRIALS

Title: Pressure Measurements beneath Below-Knee Amputation (BKA) stump bandages: elastic bandaging, the Puddifoot dressing and a pneumatic bandaging technique compared

Authors: Isherwood PA, Robertson JC, and Pioggi A

Journal & Date: British Journal of Surgery (1975) Vol. 62 pp. 992-996

Purpose of study	To ascertain the pressure distribution beneath 3 different types of bandages (i.e. Playolast, Puddifoot, and pneumatic applied to BKA by skilled and unskilled bandagers.
Design of study, score on Pedro rating scale	No score as trial not randomised or controlled. Design: One group, post intervention design
Subjects, inclusion, exclusion criteria Details, age, source. Is this group similar to your clients?	Inclusion/exclusion criteria not very detailed. Patients of both sexes with vascular and neurological diseases included: <ul style="list-style-type: none"> - 21 BKA stumps of 17 pts. - Skilled (by Physios, Amps, Nurses, and 2 authors) and unskilled (by pts. and relatives) application
Intervention for experimental group Nature, Intensity	3 different bandages applied by skilled and unskilled bandagers (as above)

Control Group, what intervention did they receive?	Pt own control
Measures	Pressure measures at 6 different locations on the stump were taken with a sphygmomanometer over a 5 minute period with both the stump resting and elevated.
Results	Only calculated mean pressures are given. The statistical significance of the results isn't calculated → ?usefulness of results.
Conclusion Is the intervention worthwhile, consider the size of the effect and the intensity of the intervention	---
Clinical Implications / Comments	Limited detail re: study design and poor statistical analysis makes it difficult to utilise the results of this study.

WORKSHEET FOR CLINICAL TRIALS

Title: Comparison of Removable Rigid Dressings and Elastic Bandages in preprosthetic management of patients with below knee amputations

Authors: Mueller MJ

Journal & Date: Physical Therapy Vol 62, no.10 pp1438-41

Purpose of study	To show that rigid removable dressing (RRD) provides greater stump shrinkage than elastic bandaging.
Design of study, score on Pedro rating scale	RCT Control grp = Elastic Bandaging Treatment grp = RRD
Subjects, inclusion, exclusion criteria Details, age, source. Is this group similar to your clients?	Inclusion criteria - Undergone BKA no longer than 2 months before the study - At least 55 yrs old Population Studied -10 men & 5 women mean age 73yrs -11 pt's unilateral amputation, 4 bilateral (one of these pt's had both amputations qualify as it was within 2 months of study being conducted -All amputations due to vascular disease

	<p>-12 pts had adult onset diabetes Overall the grp is similar to our clients</p>
<p>Intervention for experimental group Nature, Intensity</p>	<p>RRD – made from plaster rolls, hexalite or polyform, Velcro, cast stockinet and cotton cast padding</p> <ul style="list-style-type: none"> -This study used polyform instead of hexalite as it was readily available -Athletic tube socks used as stump socks (purchased from department store) -Made anterior trim line proximal to superior patella level instead of to mid patella level as this helped dressing remain secure on subjects with a short residual limb - Taught application procedure outlined by Wu (not stated in article) -Studied over 3 week period - RRD worn at all times except during hygiene, wound care or excessive pain.
<p>Control Group, what intervention did they receive?</p>	<ul style="list-style-type: none"> -Taught conventional figure of 8 wraps - Worn at all times except for hygiene etc. same as intervention grp - Worn for 3 weeks
<p>Measures</p>	<ul style="list-style-type: none"> - Circumference measures x 3 times a week at medial tibial plateau and at 4cm intervals below plateau with the knee fully extended. Points of measurement were marked on the skin to minimise measurement error, and measures for the one pt were taken by same therapist - Length of residual limb measured from medial tibial plateau to distal tibia with knee extended - Volume measurements of residual limb calculated using formula by Katch and Katch (not stated in article) - Ability of pt to apply dressing independently (criteria of measurement not stated, however noted to be Independent if able to achieve total contact of the dressing on the residual limb with no assistance) - Tendency of dressing to remain secure (remained secure if it remained in total contact with the amputated limb about 75% of the time- again no scale for measurement noted)
<p>Results</p>	<ul style="list-style-type: none"> - If mean volume change is 0 with no treatment then the elastic bandage group didn't show a significant change in limb volume measurement $p > 0.05$. - RRD grp had significant decrease in volume $p < 0.0005$. - RRD grp also had significantly greater stump shrinkage compared to elastic grp $p < 0.05$ - Independent application and secure placement achieved more often by patients using RRD than elastic

	<ul style="list-style-type: none"> - No skin breakdown noted in either group - Residual limb volume increased for some subjects in the elastic grp whereas it decreased to some extent in all subjects in the RRD grp.
<p>Conclusion Is the intervention worthwhile, consider the size of the effect and the intensity of the intervention</p>	<ul style="list-style-type: none"> - Yes the intervention is worthwhile as more people could apply it independently and it remained secure and reduced limb volume more so than the elastic bandages. - For stump volume the average improvement of the intervention was 40cm³ (95%CI 3 to 77cm³). I would consider a 10cm³ reduction over the elastic bandage technique to be clinically worthwhile. The average affect as well as the majority of the 95%CI lie to the right of the smallest clinically worthwhile effect therefore it would seem beneficial. - Similarly if it allowed 25% of people to have a more secure application and apply independently it would be worthwhile. In both instances this is the case, with secure application 62.5% (95%CI 50 to 75%) and independent application 37.5 % (95%CI 25 to 50%). Similarly the number of people needed to treat with the RRD for 1 person to gain these more secure and independent applications is 1.6 and 2.7 people respectively. Thus almost everyone treated benefits.
<p>Clinical Implications</p>	<p>Clinically the use of RRD appears beneficial over elastic bandages however it can be seen that elastic bandages still have a somewhat clinically worthwhile affect also.</p>

9. Summary of Clinical Implications Derived from Articles

There are limited trials and systematic reviews available comparing shrinkers with bandaging. Most look at rigid/semi rigid dressings and bandaging.

Multiple disadvantages with using elastic bandaging to reduce stump oedema – difficulty with application, difficult to secure, can cause malformation and increase oedema of the residual limb, can cause compromised venous flow and thromboembolism.

Stump shrinkers reduce pressure variations.

One study found shrinkers were more effective in reducing oedema than elastic bandaging but this trial had a small sample size, no follow up and did not report if there were any drop outs.

There is not much literature on the effectiveness of shrinkers in reducing oedema but there is a lot of information regarding limitations to elastic bandaging.

Currently, both shrinkers and elastic bandages are used on amputees at Braeside.

Due to the multiple disadvantages of elastic bandaging, the preferred method for stump oedema control is the use of stump shrinkers.

Care should be taken when the wound is still open and use of a stump shrinker may cause unnecessary shearing forces. Elastic bandaging may be used in such cases.

It would be advisable to network with larger institutions which treat a larger number of amputees and who would be in a position to initiate research projects investigating this topic.

10. Auto alert done: Yes

Physiotherapist's responsible: Ryan Oponda, Clementia Yuen

Hospital responsible: Braeside Hospital

Contact details and email address:

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11. Date Summary was Completed: 14th October 2003

12. Reviewed by:

Date reviewed:

Feedback given by reviewer:

PART B – HOSPITAL SPECIFIC IMPLEMENTATION

(To be replicated by any hospital within SSWAHS as required – please cut and paste additional reviews)

Hospital: Braeside Hospital

Date reviewed: 1st February 2005

1. Summary of Current Practice:

Currently, both shrinkers and elastic bandages are used on amputees at Braeside. The decision to use either method is made by individual therapists in consultation with medical staff. Patient factors are also taken into consideration – manual dexterity, cognition and stages of wound healing. Stump shrinkers are preferable due to the limitations of elastic bandaging including difficulty with application, difficulty in securing the bandage, can

cause malformation and increase oedema of the residual limb, can cause compromised venous flow and thromboembolism. Semi rigid/rigid dressings are not currently used at Braeside.

Of the 8 amputees that have been admitted to Braeside since the above EBP summary was completed, 5 have received shrinkers. Of the 3 patients that didn't receive shrinkers, 2 didn't have any form of oedema management due to poor stump healing & not being for prosthetic fitting, and 1 patient due to being allergic to both shrinkers and bandages.

2. Does information suggest you change current practice in your unit?

No

3. Implementation Planning:

a) Identify strategies that could be used to implement this evidence in your unit.

Due to the lack of literature for use of stump shrinkers, investigation of the numerous available trials for semi rigid/rigid dressings may be required to assess whether it is feasible to implement these strategies.

b) Identify barriers to change in your unit and possible ways to overcome these barriers

Stump shrinkers cost more than elastic bandaging. However, bandages require more maintenance and therefore it may be more cost effective to use stump shrinkers in the long term. Patient factors as discussed above, would also be a barrier to using stump shrinkers especially when the wound is open and is vulnerable to shearing forces. It is difficult for therapists at Braeside to construct rigid dressings as we do not have the skills due to sporadic admissions of amputees to rehabilitation.

The lack of literature also is a barrier to implementing the general consensus that shrinkers are preferred over bandaging. To overcome this, we can network with larger institutions which treat a larger number of amputees and would be in a position to initiate research projects investigating this topic.

4. What strategies will you use to review how effectively changes have been implemented in your unit?

Review technique used over the past 6 months. Compare the number of patients who used stump shrinkers vs elastic bandages and evaluate the reasons why bandaging was used instead of shrinkers (if applicable).

PART C – REVIEW

1. Date of review: 24th March 2006

Physiotherapist's responsible: Clementia Yuen, Ryan Oponda, Kim Stendara

Hospital responsible: Braeside Hospital

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2. New evidence obtained

(List additional references that are relevant to the original EBP question)

3. Please attach worksheets of relevant information:

(To be completed for each article reviewed. Cut and paste additional worksheets as needed)

WORKSHEET FOR SYSTEMATIC REVIEWS

Title:

Authors:

Journal & Date:

Purpose of Systematic review	
Methods, how did they find the relevant trials? <i>(Include databases searched, search terms and selection criteria's if known)</i>	
Methods, how did they assess their individual validity?	
Results, what were the results, were they consistent from study to study?	

Do these results apply to your patient group?	
Conclusion	
Clinical Implications	

(To be completed for each article reviewed. Cut and paste additional worksheets as needed)

WORKSHEET FOR CLINICAL TRIALS

Title:

Authors:

Journal & Date:

Purpose of study	
Design of study, score on Pedro rating scale	
Subjects, inclusion, exclusion criteria Details, age, source. Is this group similar to your clients?	
Intervention for experimental group Nature, Intensity	
Control Group, what intervention did they receive?	
Measures	

Results <i>(Include 95% confidence intervals and consider CLINICAL significance of results)</i>	
Conclusion Is the intervention worthwhile, consider the size of the effect and the intensity of the intervention	
Clinical Implications	

4. Does this new information suggest you change current practice in your unit?

No