**Mini-CAT Final RT4-W1/2 Kliti Shentolli**

Clinical Question:

Mr. S is a 62-year-old male with PMHx of type 2 DM and a diabetic foot ulcer in his left foot who was admitted to LTC for better management of his ulcer and monitoring of his overall health. For the past month, Ms. S’ diabetic foot ulcer has been managed with advanced moist wound therapy, however little improvement has been noticed. The medical team is now considering the option of initiating negative pressure wound therapy for better results.

**Search Question:**

In adult patients with type 2 DM, is negative-pressure wound therapy more efficient in treating diabetic foot ulcers than standard wound care?

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| **P** | **I** | **C** | **O** |
| Adults | Negative pressure wound therapy  | Standard wound care | Time for ulcer to heal |
| Type 2 diabetes  | Vacuum assisted closure | Advanced moist wound therapy | Surface closure of the ulcer. |
| Diabetic foot ulcers |  | Conventional wound therapy | Complete ulcer closure.  |
| Adults with foot ulcers |  | Placebo  | Tissue granulation formation. |
| Diabetic complications |  |  | Depth reduction rate  |
|  |  |  | Mental/ physical state of pts after treatment.  |
|  |  |  | Chronic wound ulcer healing rate  |

**Search tools and strategy used:**

When I was looking for articles, I narrowed my choices to primarily systemic reviews, meta-analysis and RCT’s because those would have the highest level of evidence and be more reliable. I further narrowed my choices by looking at articles that were recently published and that had certain key words that I needed for my research. When it came to this particular PICO question, it was hard finding good and resourceful articles that were published in the recent years, so I had to settle for some articles that were a little older than 10 years. For this PICO question, I first looked for systemic reviews or meta- analysis articles, and luckily, I was able to find good ones that were relevant to my PICO question. Next, I started looking for an RCT study with little to no bias.

PubMed:

* Negative pressure wound and standard therapy (Best Match) – 461
* Negative pressure wound and standard therapy (Best Match, Meta- Analysis, Systemic Review) - 56
* Negative pressure wound and standard therapy (Best Match, Meta- Analysis, Systemic Review, 5 years) – 36
* Negative pressure wound and standard therapy (Best Match, RCT, Free full text)- 26
* Negative pressure wound and standard therapy diabetic foot ulcer (Best Match, Meta- Analysis, Systemic Review, free full text) - 5
* Negative pressure wound and standard therapy diabetic foot ulcer (Best Match, RCT, free full text, 5 years) - 1

Article: “*Evaluation of negative-pressure wound therapy for patients with diabetic foot ulcers: systematic review and meta-analysis*”. I selected this article because it’s very relevant to my PICO question in comparing the effectiveness of negative pressure wound therapy vs. standard wound therapy in those patients with diabetic foot ulcers. This article was also published in 2017, and it also has the highest level of evidence by being a meta-analysis and a systematic review, which makes it a very reliable source. I also selected this article because it looks at 11 studies with a reasonable total population size of 1,044 patients, ages 55.2 to 66.6 years old, which is the same population age as my PICO question focuses on.

Article: “*A Systematic Review of the Effectiveness of Negative Pressure Wound Therapy in the Management of Diabetes Foot Ulcers*”. I selected this article because it has the highest level of evidence by being a systemic review, which makes it a reliable source. Also, this article is very relevant to my PICO question because all 4 studies included in this systemic review focus on the efficiency of negative pressure wound therapy in adult population with diabetic foot ulcer and their management.

Google Scholar:

* Negative pressure wound and standard therapy (range 2014-2020, sort by relevance) – 16,800
* Negative pressure wound and standard therapy (range 2018-2020, sort by relevance)- 17,400
* Negative pressure wound and standard therapy diabetic foot ulcer (range 2016-2020, sort by relevance)- 17,100

Article: *“Comparison of Negative Pressure Wound Therapy Using Vacuum-Assisted Closure With Advanced Moist Wound Therapy in the Treatment of Diabetic Foot Ulcers*”. I chose this article because it is very relevant to my PICO question in comparing the effectiveness of negative pressure therapy vs standard wound care such as advanced moist wound therapy in patients with diabetic foot ulcers. The article is an RCT with a population size of 342 patients which is a reasonable population size considering the extensive treatment care each of these patients received for this study. The average age for the participating patients was 58 years old, which again relates to my PICO question quite well, considering that I am focusing on the adult population.

JAMA Network:

* Negative pressure wound and standard therapy diabetic foot ulcer (articles, 2010-2020)-20
* Negative pressure wound and standard therapy diabetic foot ulcer (articles, research, 2010-2020)- 8
* Negative pressure wound and standard therapy diabetic foot ulcer (articles, research, 2010-2020, case reports)- 2
* Negative pressure wound and standard therapy (articles, anytime, research) – 198

Article: “*Negative Pressure Wound Therapy A Vacuum of Evidence?”* This is the only article I was able to get from JAMA. This article is a systematic review which has a high level of evidence and also does a good job looking at RCTs and non-RCTs and compares the effectiveness of negative pressure wound therapy vs conventional therapy in chronic wounds healing which is very relevant to my clinical question. Although this article was published in 2008, which makes it a little more than 10 years old, it still provides me with valuable information about the effectiveness of negative pressure wound therapy and how it performs when its compared to standard or conventional therapy in treating chronic wounds.

**Results found:**

Article #1

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| **Citation:** Comparison of Negative Pressure Wound Therapy Using Vacuum-Assisted Closure With Advanced Moist Wound Therapy in the Treatment of Diabetic Foot UlcersPeter A. Blume, Jodi Walters, Wyatt Payne, Jose Ayala, John LantisDiabetes Care Apr 2008, 31 (4) 631-636; DOI: 10.2337/dc07-2196 Online link: https://care.diabetesjournals.org/content/31/4/631.long |
| **Type of article:** Randomized controlled trial |
| **Abstract****OBJECTIVE—**The purpose of this study was to evaluate safety and clinical efficacy of negative pressure wound therapy (NPWT) compared with advanced moist wound therapy (AMWT) to treat foot ulcers in diabetic patients.**RESEARCH DESIGN AND METHODS—**This multicenter randomized controlled trial enrolled 342 patients with a mean age of 58 years; 79% were male. Complete ulcer closure was defined as skin closure (100% reepithelization) without drainage or dressing requirements. Patients were randomly assigned to either NPWT (vacuum-assisted closure) or AMWT (predominately hydrogels and alginates) and received standard off-loading therapy as needed. The trial evaluated treatment until day 112 or ulcer closure by any means. Patients whose wounds achieved ulcer closure were followed at 3 and 9 months. Each study visit included closure assessment by wound examination and tracings.**RESULTS—**A greater proportion of foot ulcers achieved complete ulcer closure with NPWT (73 of 169, 43.2%) than with AMWT (48 of 166, 28.9%) within the 112-day active treatment phase (P = 0.007). The Kaplan-Meier median estimate for 100% ulcer closure was 96 days (95% CI 75.0–114.0) for NPWT and not determinable for AMWT (P = 0.001). NPWT patients experienced significantly (P = 0.035) fewer secondary amputations. The proportion of home care therapy days to total therapy days for NPWT was 9,471 of 10,579 (89.5%) and 12,210 of 12,810 (95.3%) for AMWT. In assessing safety, no significant difference between the groups was observed in treatment-related complications such as infection, cellulitis, and osteomyelitis at 6 months.**CONCLUSIONS—**NPWT appears to be as safe as and more efficacious than AMWT for the treatment of diabetic foot ulcers. |

Article #2

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| **Citation:** Liu, Si et al. “Evaluation of negative-pressure wound therapy for patients with diabetic foot ulcers: systematic review and meta-analysis.” Therapeutics and clinical risk management vol. 13 533-544. 18 Apr. 2017, doi:10.2147/TCRM.S131193Online link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5403129/>  |
| **Type of article:** Systematic review and Meta-analysis  |
| **Abstract:** **Objectives**The aim of this study was to perform an updated systematic review and meta-analysis to assess the clinical efficacy, safety, and cost-effectiveness of negative-pressure wound therapy (NPWT) in the treatment of diabetic foot ulcers (DFUs).**Methods**We searched the Cochrane Library, MEDLINE, EMBASE, Ovid, and Chinese Biological Medicine databases up to June 30, 2016. We also manually searched the articles from reference lists of the retrieved articles, which used the NPWT system in studies of vacuum-assisted closure therapy. Studies were identified and selected, and two independent reviewers extracted data from the studies.**Results**A total of eleven randomized controlled trials, which included a total of 1,044 patients, were selected from 691 identified studies. Compared with standard dressing changes, NPWT had a higher rate of complete healing of ulcers (relative risk, 1.48; 95% confidence interval [CI]: 1.24–1.76; P<0.001), shorter healing time (mean difference, −8.07; 95% CI: −13.70– −2.45; P=0.005), greater reduction in ulcer area (mean difference, 12.18; 95% CI: 8.50–15.86; P<0.00001), greater reduction in ulcer depth (mean difference, 40.82; 95% CI: 35.97–45.67; P<0.00001), fewer amputations (relative risk, 0.31; 95% CI: 0.15–0.62; P=0.001), and no effect on the incidence of treatment-related adverse effects (relative risk, 1.12; 95% CI: 0.66–1.89; P=0.68). Meanwhile, many analyses showed that the NPWT was more cost-effective than standard dressing changes**.****Conclusion:**These results indicate that NPWT is efficacious, safe, and cost-effective in treating DFUs.Keywords: diabetic foot ulcers, negative-pressure wound therapy, complete wound closure, amputation, meta-analysis, cost-effectiveness |

Article #3

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| **Citation:** Noble-Bell, Georgia, and Angus Forbes. “A Systematic Review of the Effectiveness of Negative Pressure Wound Therapy in the Management of Diabetes Foot Ulcers.” International Wound Journal, vol. 5, no. 2, 2008, pp. 233–242., doi:10.1111/j.1742-481x.2008.00430.x**.**Online link: <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1742-481X.2008.00430.x?casa_token=DK2GRRYa1E0AAAAA%3AyEW9QYfPOPJJsEd8aIB98AQkHxJcaJnZhftp231nuWmWDisTbjmRsMYmOtXkqt5EOskDUgcGt5yxVg> |
| **Type of article:** Systematic review |
| **Abstract:** Foot ulcers are a common complication in patients with diabetes. Negative pressure wound therapy (NPWT) is a wound care therapy that is being increasingly used in the management of foot ulcers. This article presents a systematic review examining the effectiveness of this therapy. The review question is how effective is NPWT in achieving wound healing in diabetes foot ulcers? The primary outcome for this study was the number of patients achieving complete wound healing (secondary outcomes, other markers of wound healing, adverse events and patient satisfaction). A systematic literature review and tabulative synthesis of randomised controlled trials (RCTs). The review identified four RCTs of weak to moderate quality. Only one study examining NPWT in postamputation wound healing reported data on the primary outcome. These data show a 20% improvement in wound healing [odds ratios = 2·0%, confidence interval (CI) −1·0 to 4·0] and number needed to treat = 6 (CI 4–64). No serious treatment‐related complications were reported by any of the studies. One study suggested a reduction in the risk of secondary amputation (absolute risk reduction = 7·9%, CI 0·5–15·43). Studies also reported an increase in granulation and wound‐healing rates in patients treated with NPWT therapy. No data on patient satisfaction or experience were reported. While all the studies included in the review indicated that the NPWT therapy is more effective than conventional dressings, the quality of the studies were weak and the nature of the inquiries in terms of outcome and patient selection divergent. There is a strong need for larger trials to assess NPWT therapy in diabetes care with different groups of patients and in relation to different clinical objectives and parameters.**Methods**The aim of the review was to assess the clinical effectiveness of NPWT in the treatment of diabetes‐related foot ulcers. The review objectives were to identify and retrieve primary studies relating to the effectiveness of NPWT in the management of diabetes foot ulcersto critically appraise the quality of the selected studies to extract relevant information from the selected studies to synthesize the data extracted to provide an overview of the evidence for the use of NPWT.**Outcomes**The primary outcome for this study was the number of patients achieving complete wound healing (defined as complete reepithelization or wound closure). However, it was anticipated that other facets of wound healing may also be clinically important, such as the mean number of days to wound healing and the speed of reduction in wound size and tissue repair. In addition, results relating to any adverse events associated with NPWT and information on the patients’ experience (satisfaction and quality of life) of the therapy were sought.**Conclusions**NPWT is becoming an increasingly popular therapy in the management of diabetes‐related foot ulcers and wounds. The studies included in this review generally report positive findings for NPWT, without any major adverse events. The findings from the strongest study included in the review suggest that the NPWT may be particularly beneficial in relation to wound healing following partial foot amputation. However, most of the studies were small, heterogeneous and methodologically weak. There is a need for much larger rigorous studies to be undertaken and to further investigate the effectiveness of NPWT in treating different types of diabetes‐related foot ulcers, both as a monotherapy and in conjunction with other treatments. Such studies would do well to follow the Medical Research Council’s Complex Evaluation Framework to address the inherent complexities of this therapy 31. Given the high cost of the therapy, an economic assessment of the therapy should be a core component of any future trials. Finally, there is very little data detailing the patients’ experience of NPWT, given the intensive nature of the therapy this is another area that needs consideration. |

Article #4

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| **Citation:** Gregor S, Maegele M, Sauerland S, Krahn JF, Peinemann F, Lange S. Negative Pressure Wound Therapy: A Vacuum of Evidence? Arch Surg. 2008;143(2):189–196. doi:10.1001/archsurg.2007.54 Online link: <https://jamanetwork.com/journals/jamasurgery/fullarticle/401480>  |
| **Type of article:** Systematic Review |
| **Abstract****OBJECTIVE:**To systematically examine the clinical effectiveness and safety of negative pressure wound therapy (NPWT) compared with conventional wound therapy.**DATA SOURCES:**MEDLINE, EMBASE, CINAHL, and the Cochrane Library were searched. Manufacturers were contacted, and trial registries were screened.**STUDY SELECTION:**Randomized controlled trials (RCTs) and non-RCTs comparing NPWT and conventional therapy for acute or chronic wounds were included in this review. The main outcomes of interest were wound-healing variables. After screening 255 full-text articles, 17 studies remained. In addition, 19 unpublished trials were found, of which 5 had been prematurely terminated.**DATA EXTRACTION:**Two reviewers independently extracted data and assessed methodologic quality in a standardized manner.**DATA SYNTHESIS:**Seven RCTs (n = 324) and 10 non-RCTs (n = 278) met the inclusion criteria. The overall methodologic quality of the trials was poor. Significant differences in favor of NPWT for time to wound closure or incidence of wound closure were shown in 2 of 5 RCTs and 2 of 4 non-RCTs. A meta-analysis of changes in wound size that included 4 RCTs and 2 non-RCTs favored NPWT (standardized mean difference: RCTs, -0.57; non-RCTs, -1.30).**CONCLUSIONS:**Although there is some indication that NPWT may improve wound healing, the body of evidence available is insufficient to clearly prove an additional clinical benefit of NPWT. The large number of prematurely terminated and unpublished trials is reason for concern |

**Summary of the Evidence**:

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| Author (Date) | Level of Evidence | Sample/Setting(# of subjects/ studies, cohort definition etc) | Outcome(s) studied | Key Findings | Limitations and Biases |
| 1) Peter A. Blume, Jodi Walters, Wyatt Payne, Jose Ayala, John Lantis (2008)  | Randomized controlled trial | This was a randomized control trial which was accomplished generating blocks of numbers through a website called (randomizer.org) and those numbers were then given randomly to the patients and based on the number they received, that would determine the treatment they received. A total of 342 patients were enrolled at one Canadian and 28 U.S. sites. Patients participated in this study, all age over 18 years old with stage 2 or stage 3 diabetic foot ulcers. Participating patients were assigned either to the intervention group (treated with negative pressure wound therapy) or to the controlled group (treated with advanced moist wound therapy).Each patient was examined weekly for the first 28 days, then every other week until day 112. Patients with Charcot disease, untreated osteomyelitis, cellulitis or ulcers from electrical, chemical or radiation burns were excluded from this study.  | *Primary outcome*: -Complete ulcer surface closure time. -Granulation tissue formation.-Complete ulcer closing.-Reduction of ulcer area.*Secondary outcome*:Ulcer-related complications. Ulcer-related infections | *Primary outcome*:- When assessing the time it took for ulcers to close, patients in the intervention group (negative pressure wound therapy) had their ulcers close at an average time of 58 days while patients in the control group had their ulcers close in 84 days. - 17 patients from the intervention group were able to achieve 76-100% tissue granulation formation, while only 8 patients from the control group were able to achieve76-100% tissue granulation formation. -Out of 169 patients who were treated with negative pressure wound therapy, 73 of them (43.2%) reported complete ulcer closing while out of 166 patients who received advanced moist wound therapy, only 48 (28.9%) of them reported complete ulcer closing. - Patient in the intervention group showed an average of -4.32 cm^2 ulcer area reduction, while patients in the control group showed an average of -2.53cm^2 ulcer area reduction. Secondary outcome: -No significant difference was observed in ulcer-related complications such as infections. | This article was published in 2008 which is more than 10 years ago, making the data collected not as strong as we would’ve liked. Another limitation is that in the study, 79% of the patients were male and only 21% females, making this data more applicable to the male population and not so much to the female population. |
| 2) Liu, Si et al (2017) | Systematic review and Meta-analysis | This was a Systematic review and Meta-analysis which included 11 studies with a total population size of 1,044 patients, with the mean age ranging from 55.2 to 66.6 years old and the intervention time ranging from 14 to 112 days. Studies included in this article came from Cochrane Library, MEDLINE, EMBASE, Ovid, and Chinese Biological Medicine databases. Inclusion criteria included RCT’s comparing NPWT (negative pressure wound therapy) with standard dressing changes in diabetic patients, diabetic patients with chronic foot ulcers and English and Chinese publication languages only. Exclusion criteria: studies that were not RCT’s, NPWT was not compared directly to standard dressing and those studies that did not show outcomes.  | -Time to completely heal diabetic foot ulcers.-Depth reduction rate of diabetic foot ulcers. - Patient’s physical and mental state health after treatment with NPWT vs. standard dressing. -Adverse effects caused by each treatment.  | -When assessing the time to completely heal diabetic foot ulcers, NPWT group experienced a shorter amount of time than those treated with standard dressing (mean difference: −8.07, 95% CI: −13.70– −2.45, P=0.005).-When assessing the depth reduction rate of diabetic foot ulcers, the NPWT group reported a higher rate of depth reduction than the control group who were treated with standard dressing: (95% CI: 8.50–15.86, P<0.00001).-A 36-item form health survey was given to every participating patient from both the intervention and control group, before and after treatment. Questionnaire included 2 sections: patient’s physical and mental state. The results from this questionnaire showed negative pressure wound therapy was significantly positive for both mental and physical health when compared to those patients in the standard wound dressing. -As for adverse effects caused by both NPWT and standard wound dressing, there was no significant differences between the two treatments.  | Raw data were not fully provided by some of these studies included in this meta-analysis/systemic review, which it would have been nice to see some of the actual numbers and percentages.  |
| 3) Noble-Bell, Georgia, and Angus Forbes(2008) | Systematic review  | This article included 4 RCTs studies that focused on postamputation wound healing ulcers in people with diabetes. A total of 206 patients were included in these studies and was published in 2008. Inclusion criteria included RCTs that compared negative pressure wound therapy with standard wound dressing, RCTs that talked about the benefits of NPWT in postamputation wound treatment, and RCTs that assessed the overall benefits of NPWT in ulcer treatment.  | -Time for wounds to be closed. -Complete wound healing-Overall benefits of NPWT as a stand-alone treatment.-Use of NPWT as chronic wounds. -Major adverse effects when compared to conventional therapy.  | -When assessing the time for wound closure, patients in the negative pressure wound therapy group reported on average a 20 day earlier wound closure than those in the conventional wound therapy. -Based on the data from the RCTs, this article also reported that patients treated with NPWT had a 20% better chance of achieving complete wound healing than conventional therapy. RCTs, reported that intervention groups out-performed control groups in almost all the categories.- This article also reported that NPWT would best perform and yield it’s highest results if there is an abundance of blood supply near the area of an ulcer of interest. In those patients with a postamputation wound. - Negative pressure wound therapy can not only be use for acute wound care, but it also significantly decreases the time in wound healing in those patients with chronic wounds.-Major adverse effects associated with NPWT were not reported.  | Only 4 RCTs were included in this systemic review with a population size of only 206 patients, which is a small population size. Another limitation is the year it was published. This article was published in 2008, more than 10 years ago which may make some of these data in the article a little outdated, considering the more improved convention wound therapies we have today.  |
| 4) Gregor S, Maegele M, Sauerland S, Krahn JF, Peinemann F, Lange S(2008) | Systematic Review | 7 RCTs with a combined population size of 324 patients and 10 non-RCTs with a combined population size of 278 patients were included in this article. These studies were selected using MEDLINE, EMBASE, CINAHL, and the Cochrane Central Register of Controlled Trials. Selection criteria included those studies that evaluated the effects of NPWT vs conventional wound therapy on wound healing. All abstracts of potential studies were further screen by 2 independent reviewers before including them in this article. Exclusion criteria included those studies that the two independent reviewers deemed as not relevant and those studies with no clear data. Each study was also evaluated for the presence of any potential industrial sponsorship and excluded if that was the case.  | -Wound closure and reduction of wound size between NPWT and conventional therapy. - Differences between NPWT and conventional therapy in repeated amputation rates. -Adverse event rates between NPWT and conventional therapy.-Mortality rate between the two treatments.  | -Out of the 5 RCT that directly compared wound closure between conventional wound therapy vs NPWT, only 2 of them reported significant advantages in favor of NPWT. For non-RCTs, half of them reported a significant advantage in using NPWT rather than conventional therapy for complete wound closure. Not all studies in this article reported wound size but those that did, they measured the wound size for each patient after treatment and reported a significant reduction in wound size if favor of NPWT (RCTs: SMD, −0.57; 95% CI, −0.94 to −0.20; non-RCTs: SMD, −1.30; 95% CI, −2.07 to −0.54). -There was only one study in this systematic review which compared the repeated amputation rate between those patients who were treated with NPWT and conventional therapy and this study did note a reduction in amputation rates in the NPWT group, however raw data did not suggest to be a significant difference between the two treatment groups. - There was no significant differences between two treatments when it came to adverse events. 7 of the studies reported no differences in adverse effects between the two treatments, and only 2 studies reported that patients from the NPWT reported fewer complications, however statistical analysis did not indicate that as significant enough. - One non-RCT reported that mortality rate in the NPWT group was significantly lower when compared to conventional wound therapy group.  | Although this systematic review included 17 studies, each individual study had a small population size. This article was also published in 2008 which makes it more than 10 years old, however its conclusion and clinical results are relevant to my clinical question. Another limitation is that not all studies included in this article are RCT. Out of a total of 17 studies, 10 of them are non-RCTs.  |

**Conclusions**:

*Article #1*: Peter A. Blume, Jodi Walters et al concluded that negative pressure wound therapy is more effective than standard wound therapy in treatment of diabetic foot ulcers. Negative pressure wound therapy yielded better results in all categories and showed a significantly higher rate of efficiency than standard wound therapy. This RCT also concluded that negative pressure wound therapy is just as safe as standard wound therapy.

*Article #2*: Liu, Si et al further evaluated negative pressure wound therapy and standard wound therapy in two additional categories (depth reduction rate of the ulcers and mental/ physical state of participating patients before and after treatments) and concluded that NPWT is not only safe to use in diabetic foot ulcers but also showed great effectiveness in treating such condition.

*Article #3*: Noble-Bell, Georgia et al concluded that the use of NPWT in management of diabetic related foot ulcers is becoming more popular due to its effectiveness without any major adverse effects. Although this systematic review supports the use of NPWT for treatment of diabetic foot ulcers it also recognizes the need for further studies and research as most of the studies in this systematic review were small. This systematic review also concluded that the use of NPWT in wound healing following postamputation is also very effective, however that effectiveness partly depends on the blood supply in that same area.

*Article #4*: Gregor S, Maegele M, Sauerland S, Krahn JF et al concluded that although NPWT may show improvement in treating diabetic related ulcers and in some cases be even more effective than conventional wound therapy, the body of evidence available in this systematic review is not enough to clearly state that NPWT should be used instead of conventional wound therapy. Further clinical trials should be conducted before clinicians start using NPWT as a replacement for conventional wound therapy.

*Overall conclusion*: Based on the data provided by each of these articles and the numerous categories where NPWT was significantly more superior than conventional wound therapy in treating ulcers, I conclude that NPWT in adult patients with diabetic foot ulcers shows to be more efficient when compared to conventional wound therapy.

**Clinical bottom line**:

Weight of the evidence:

I weighted my second article by Liu, Si et al as the highest because it was a systematic review and meta-analysis which has the highest level of evidence. The article was also published in 2017 which is pretty recent and its very relevant to my clinical question. In this article, 11 studies with a total population size of 1,044 patients were included which makes its data and conclusion more reliable. Additional reason why I weighted this article the highest is because it evaluated studies that directly compared the effectiveness of NPWT and standard therapy in the treatment of diabetic foot ulcers. It also evaluated the effectiveness of both treatments in multiple categories such as: healing ulcer time, reduction rate in ulcer area, reduction rate in ulcer depth and patient’s physical and mental state health after treatment. In all those categories, NPWT proved to be significantly more effective and yielded better results.

I weighted my first article by Peter A. Blume, Jodi Walters et al as my second highest because it’s a well-executed RCT and takes an extensive look on how well NPWT performs in multiple categories when compared with standard therapy in treating diabetic foot ulcers. It has a population size of 342 patients which is a reasonable population size considering the extensive treatment care each of these patients received for this study and the average age of the participating patients in this study was 58 years old, which is the population age of my interest for my clinical question. This RCT is very relevant to my clinical question as it compares the effectiveness of NPWT in patients in the intervention groups vs the effectiveness of standard therapy in the patient in the control group. To reach to a conclusion, the researchers of this RCT compared the two treatments in multiple categories such as: complete ulcer surface closure time, granulation tissue formation, complete ulcer closing, reduction of ulcer area and ulcer-related infections/complications. In almost all the categories, NPWT outperformed standard therapy in treatment of diabetic foot ulcers.

I weighted my third article by Noble-Bell, Georgia et al as my third highest, because although it is a systematic review it only evaluated 4 RCTs with a total population size of 206 patients which for a systematic review is low. When individually looking at those 4 RCTs, the population size for each one of them was relatively small which was recognized by the authors of this article and led them to conclude that further studies and research needs to be conducted to come to a more credible conclusion. With that being said, its important to note that this article also did a good job evaluating the effectiveness of NPWT when compared to standard therapy at some extent. Patients who were treated with NPWT reported a wound closure 20 days earlier than those in the control group and also had a 20% better chance of achieving complete wound healing than those in the control group. It is also important to note that out of the 4 articles, this systematic review was the only one to talk about the effectiveness and use of NPWT for chronic wounds and wound healing following postamputation.

I weighted my fourth article by Gregor S, Maegele M, Sauerland S, Krahn JF et al as my last one because although it’s a systematic review, it draws its conclusion from 7 RCT’s and 10 non-RCTs which may not be as reliable as the previous 3 articles. Being published in 2008 makes this article a bit outdated which also adds to the reason why I weighted this at the bottom. Overall, this article reported a more favorable outcome for the patients in the NPWT treatment, however, the authors of this systematic review noted that some of the studies included in this systematic review had a weak methodologic quality and concluded that further research needs to be conducted.

Magnitude of effect

Based on the 4 articles discussed above, the use of NPWT in patients with diabetic foot ulcers has proven to be very effective and its appears that for the most part it has also shown more clinical effectiveness when compared directly to standard wound therapy.

Clinical Significance:

As discussed above, negative pressure wound therapy offers several clinical advantages compare to standard wound therapy in treating diabetic foot ulcers. Overall, NPWT showed that it can significantly reduce the time to wound closure and complete wound healing which can help return these diabetic patients to their baseline more quickly and aid in improving their overall quality of life. Traditional wound healing therapy can consist of moist dressing that are changed up to three times a day which can sometimes result in the gauze becoming painfully adherent to the wound and complicate things further. On the contrary, NPWT dressing is changed less frequently therefore avoiding such possible complications and as we saw in article # 2 by Liu, Si et al patients who were treated with NPWT were significantly more satisfied than those who received standard wound therapy. As for adverse effects, all 4 articles reported no significant differences between NPWT and standard wound healing. I think that NPWT should not necessarily completely replace standard wound therapy in patients with diabetic foot ulcers, however I believe that it should be presented as an option for these patients and they can talk with their provider to see if the use of NPWT instead of standard wound therapy would be more beneficial for them.

Other considerations:

Although the majority of research on negative pressure wound therapy reports positive results and feedback, further research is needed, especially when looking at the practicality and cost effectiveness. Yes, NPWT does not require a frequent change in wound dressing, however patients who do use NPWT would have to carry a portable pump around with them at all times. This would be a good research topic in determining if patients would rather prefer to carry the pump or have their wound dressing changed more frequently. When it comes to cost, NPWT systems are more expensive than traditional wound therapy, however if there is a faster wound healing process in NPWT then overtime the overall cost might be cheaper than standard wound therapy which could last longer than NPWT.

Source: <https://www.uptodate.com/contents/negative-pressure-wound-therapy?csi=558ef9af-9998-4e72-835d-a9cd771906a9&source=contentShare>