

The Importance of Proteases in Wound Healing and Wound Assessment



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ABSTRACT

Proteases have various roles in wound healing such as the migration and activation of fibroblasts, extra cellular matrix remodelling and growth factor activation. However, in some non-healing chronic wounds, protease activity remains at an elevated level which impairs wound healing and can lead to chronic inflammation. The impact of elevated protease activity on wound healing is being discussed more frequently clinically and the need to control these proteases is being considered in the selection of treatment for chronic wounds.

A number of signs and symptoms are being used to alert the clinician to chronic inflammation and potential elevated protease activity. These include swelling, pain, colour, fibrin deposition and pebbled granulation tissue, to name but a few, but at present there is no visual assessment that conclusively indicates the presence of elevated protease activity in the wound microenvironment.

As this is a developing field in the wound healing arena, a survey was carried out to assess the clinical importance, relevance and current understanding of proteases and their impact on wound healing and treatment choice.

A survey was carried out to establish the clinical importance and current understanding of proteases and their impact on wound assessment and treatment choice. The results presented here are the results and conclusions from this survey.

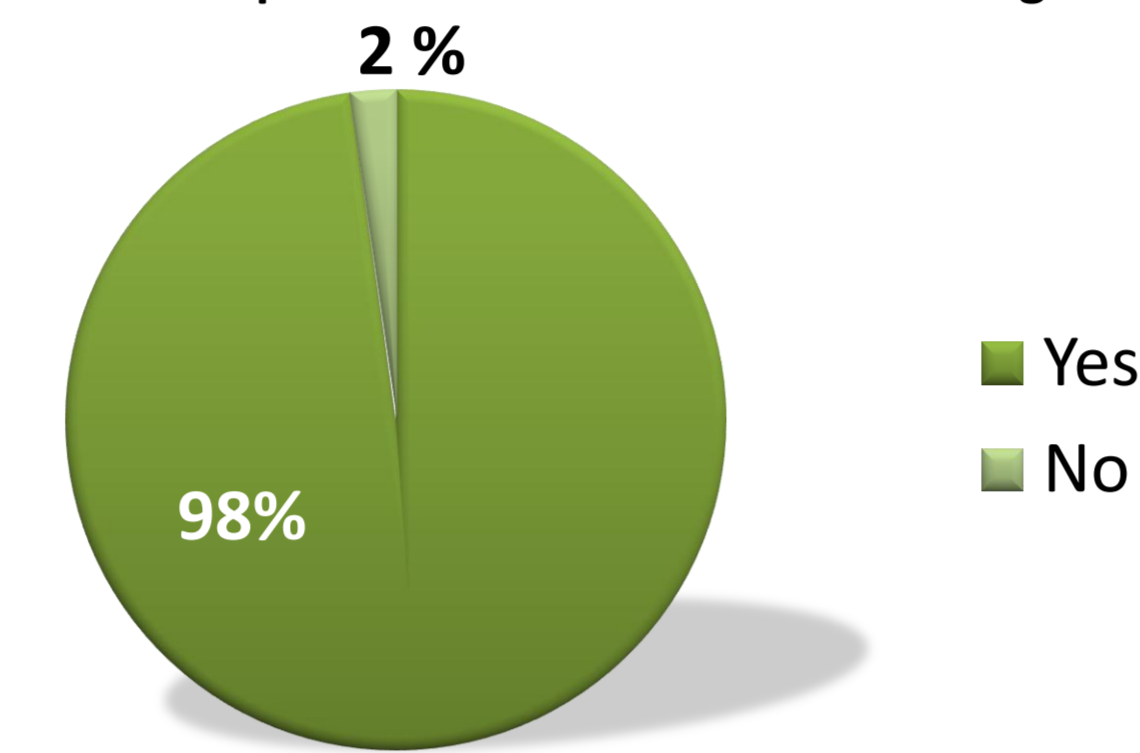
METHOD

A 22 question survey was prepared by a leading wound care clinician and sent to over 500 registered wound care professionals' and clinicians from a range of disciplines. Their responses were collected and analysed.

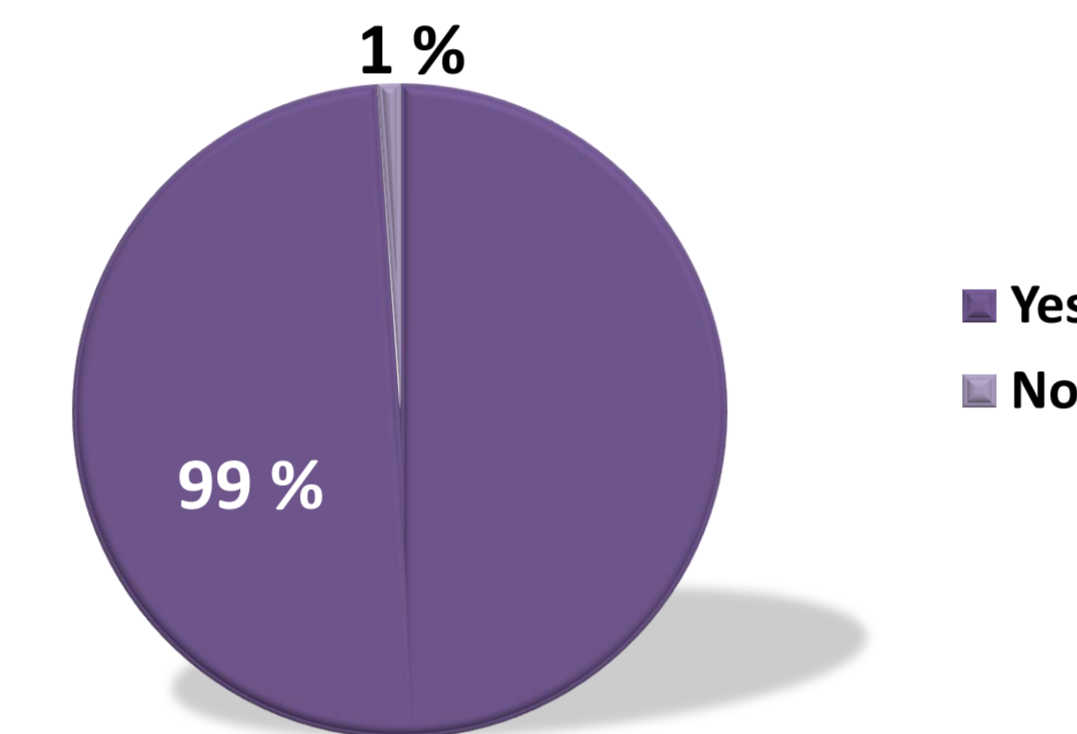
RESULTS

CLINICAL IMPORTANCE OF PROTEASES

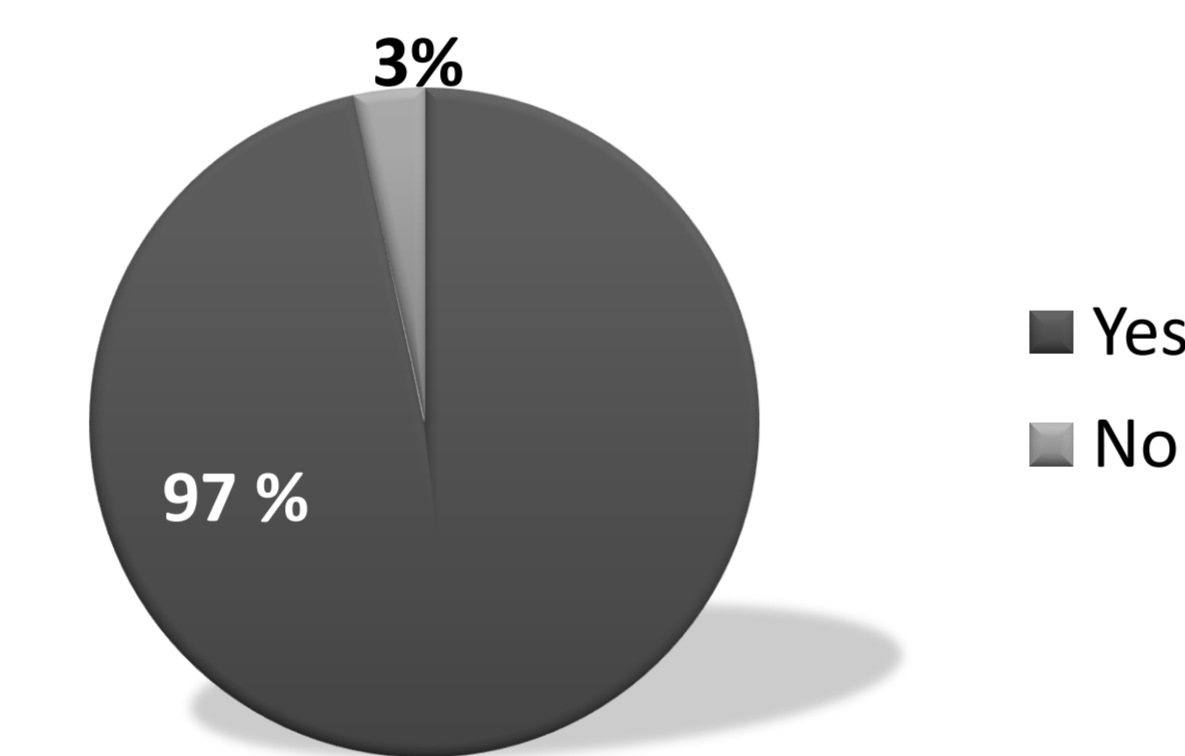
Are proteases important in normal wound healing?



Is it important to know about excessive proteases (EPA) in stalled wounds?

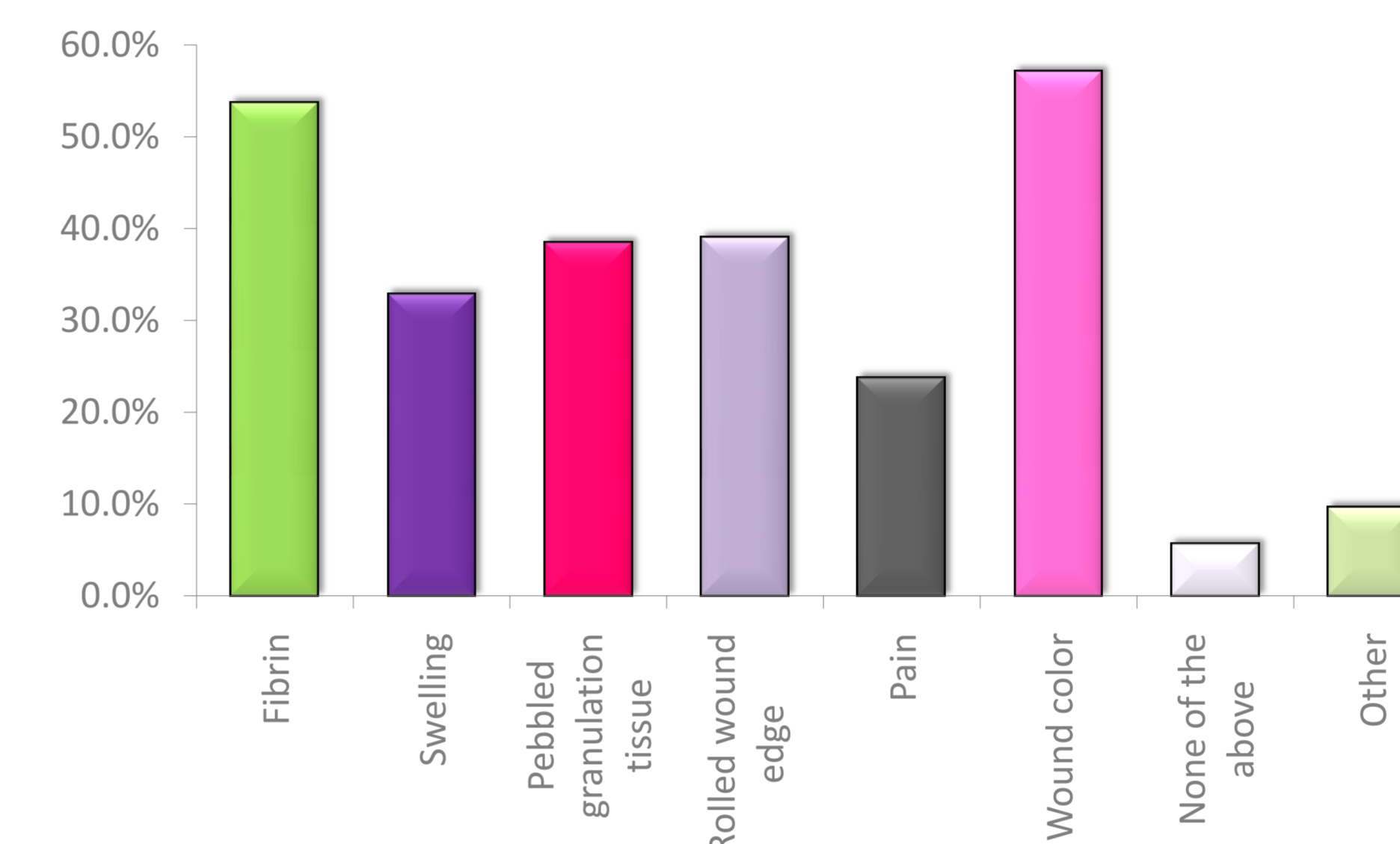


Would an immediate Point of Care (POC) diagnostic test that alerted you to excess protease activity (EPA) be useful?



PERCEIVED CLINICAL SIGNS FOR ELEVATED PROTEASE ACTIVITY

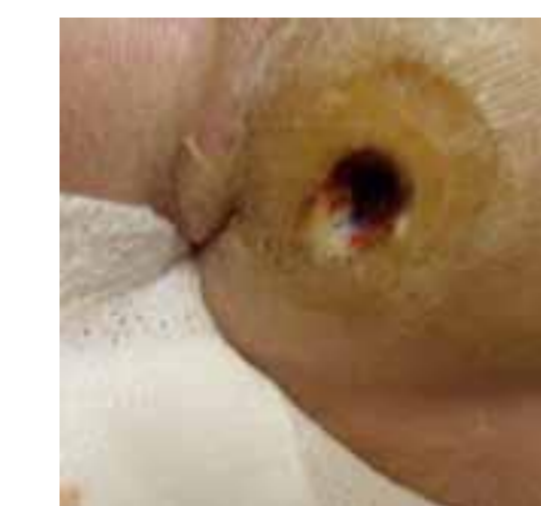
Which, if any of the following symptoms alert you to excessive protease activity (EPA)?



(Clinician may select more than one answer.)

Clinicians were asked to look at a series of wound pictures and clinical information. They were asked to determine if the wounds had elevated protease activity (EPA).

Wound without EPA



Wound with EPA



* No conclusive agreement on signs and symptoms.

MANAGEMENT OF ELEVATED PROTEASE ACTIVITY

The International Consensus of the Role of Proteases in Wound

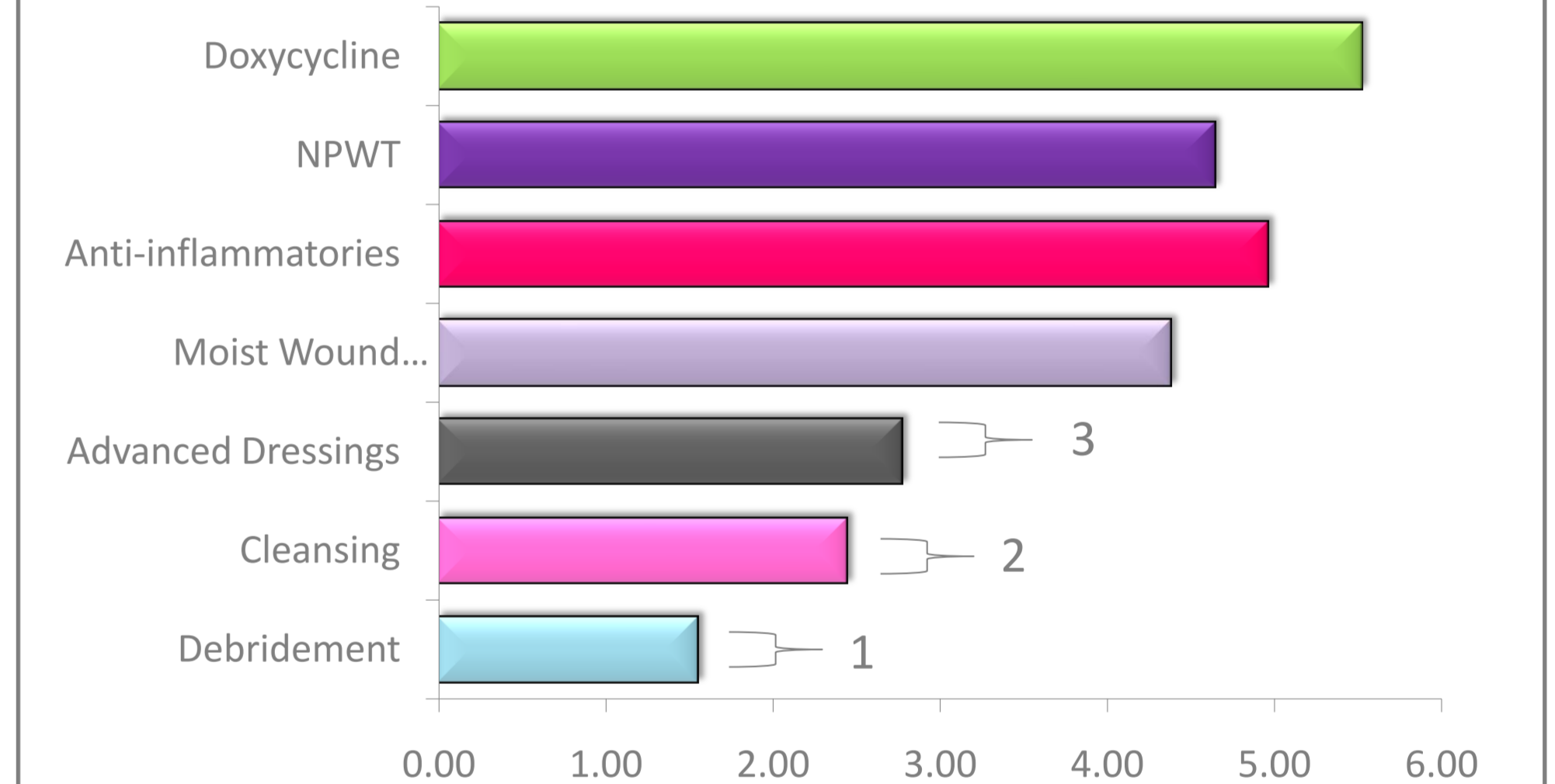
Diagnostics listed the following techniques which may reduce

protease activity in wounds ⁽¹⁾

- Cleansing
- Debridement
- Protease Inactivators
- Antiseptic dressings
- Anti-inflammatories
- Dressing and devices that absorb/remove wound exudates

Clinician were then asked how they treated them in practice.

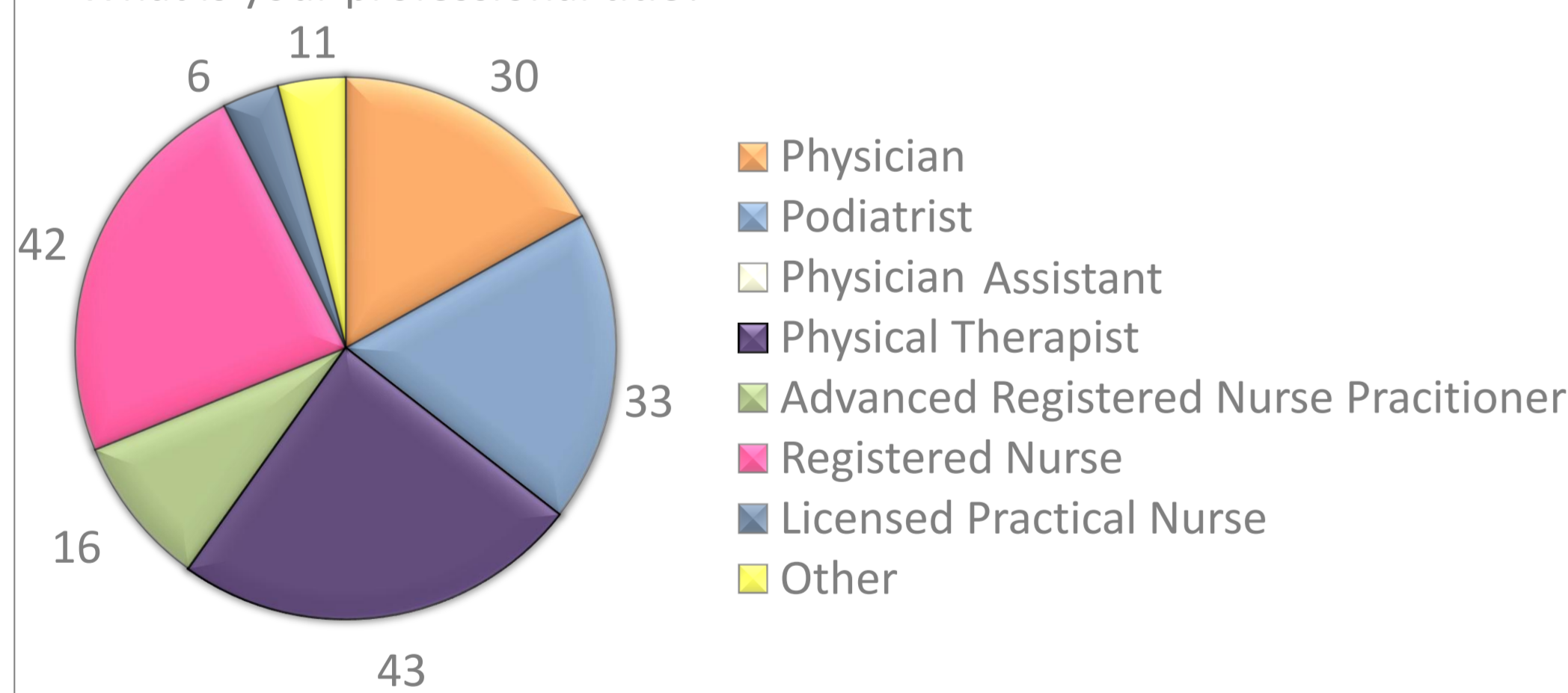
How do you treat elevated protease activity in your practice?



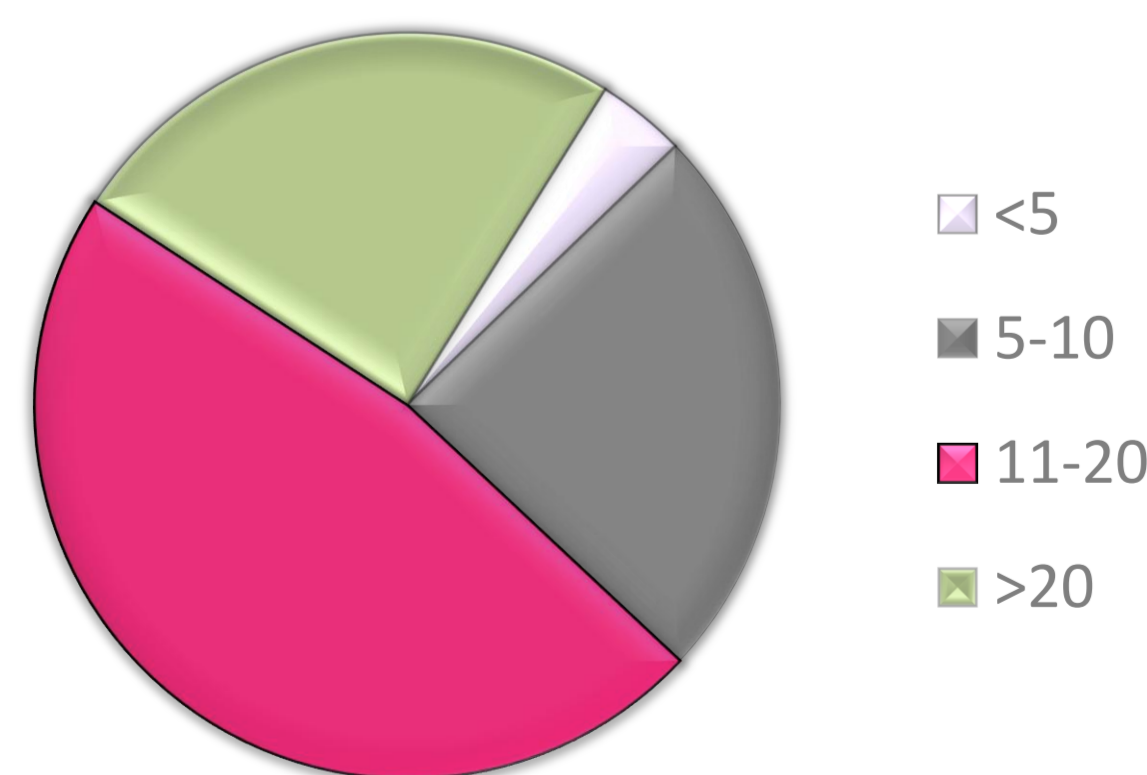
(Therapies were ranked 1 being most important and 7 being least important)

RESPONDENT DEMOGRAPHIC N = 181

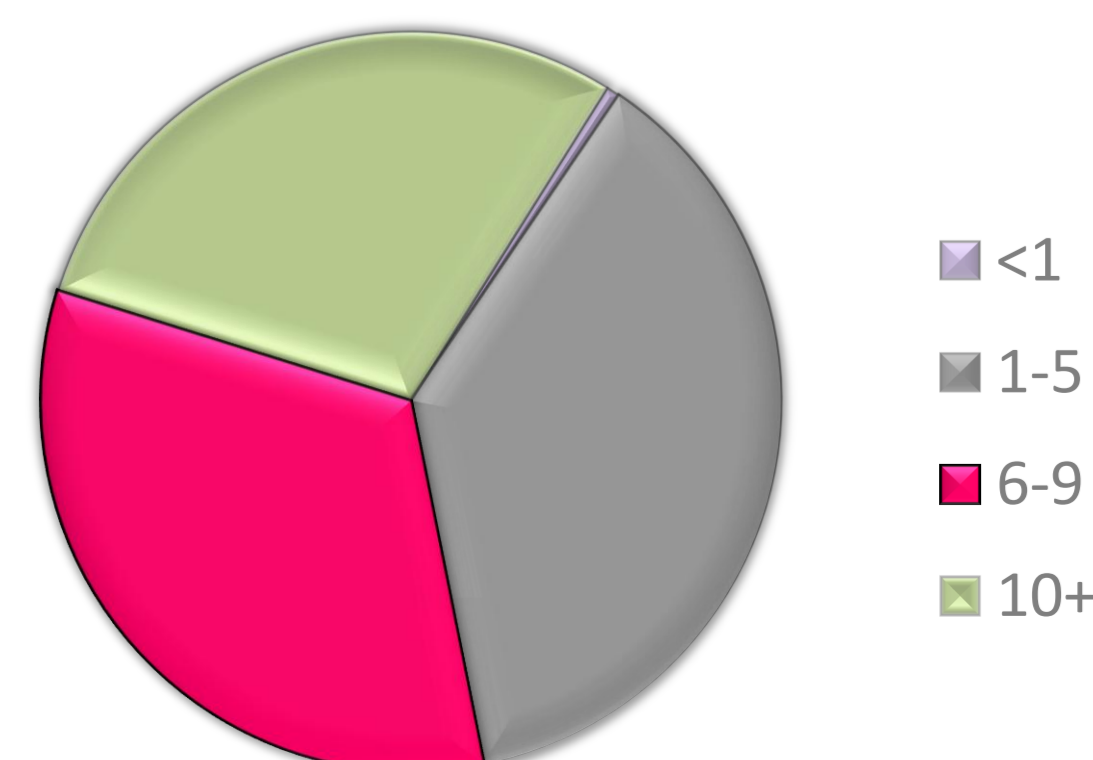
What is your professional title?



How many years have you worked in wound care?



How many years have you been certified as a Wound Specialist?



DISCUSSION

The survey conclusively shows the need to assess and determine if proteases present in a wound are elevated, and that measuring these proteases with a point of care diagnostic test would be useful. It determined that knowing the protease activity status of a wound was important in order to help with treatment selection. Furthermore they stated that clinical signs and symptoms do not always correlate with what is going on in the wound microenvironment and do not provide enough clarity to help determine the appropriate treatment. The variation in response to the symptoms used to indicate elevated protease activity indicates why clinicians indicated that a POC test would be helpful as 98% of clinicians believe that protease are important in normal wound healing. The majority also believed that the appropriate treatment to help control protease activity should be administered locally / topically with debridement, cleansing and advanced dressing scoring highly in the management of wounds where elevated protease activity is suspected.

CONCLUSION

The survey was well received and the importance of proteases in wound healing was assessed and determined to be high. The link between the biochemical environment and treatment was determined to be important and the need for a clinical point of care test considered useful in helping the clinician determine best treatment choice for the patient.

- There is no agreement for common signs and symptoms of elevated protease activity (EPA)
- Treatment is mainly topical with debridement, cleaning and advanced dressing
- Clinicians believe that proteases and an ability to measure elevated protease activity (EPA) is important.

REFERENCES

- The Role Of Proteases in Wound Diagnostics. International consensus. Wound International. 2011