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How to prepare a trichogram with transparent enamel base coat?

Abordagem dos aspectos técnicos no preparo da lâmina de tricograma com base de esmalte incolor

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ABSTRACT

The trichogram is an easy and semi-invasive method, useful for evaluating different types of hair loss in daily practice. To date, there is no standardized methodology on how to collect and perform the exam. The use of a liquid interface between the slide and the coverslip to read the trichogram under optical microscopy varies widely in the literature. Among the alternatives, transparent enamel base coat is an inexpensive, accessible, and practical option, providing the examiner with proper visualization of the hair shafts with minimal air bubbles formation.

Keywords: Alopecia; Hair diseases; Scalp dermatoses

RESUMO

O tricograma configura-se em método semi-invasivo de fácil aplicabilidade e baixo custo, útil na avaliação dos diversos tipos de queda capilar no consultório dermatológico. Até o momento, não há padronização da técnica para coleta e realização do exame. A utilização de meios de interface entre lâmina e lamínula para a leitura do tricograma à microscopia óptica varia amplamente na literatura. Dentre as alternativas, a utilização de base de esmalte incolor configura-se em opção de baixo custo acessível e prática, além de permitir a visualização das hastes capilares com mínima formação de artefato.

Palavras-chave: Alopecia; Dermatoses do couro cabeludo; Doenças do cabelo

How I do it?

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INTRODUCTION

The recent expansion of knowledge in trichology challenges the physician in searching for a more detailed and objective medical evaluation. However, cutting-edge technologies for the assessment of hair and scalp are not always available. In this context, the trichogram is a semi-invasive method with easy application and low cost, accessible to every dermatologist dedicated to studying hair disorders.

DISCUSSION

After Trotter (1989-1991) described the hair growth cycle, most studies on follicular dynamics were conducted based on the microscopic evaluation of hairy roots (HR).¹ The technique for this assessment, later called trichogram, still helps to interpret various disorders of the hair growth cycle and has practical value since it is a semi-invasive method with easy applicability and low cost.^{1,2,3}

The exam consists of collecting 50 to 100 hair strands, usually from two scalp regions (parietal and occipital), and subsequently adjusting the hairy roots on a glass slide.^{1,4} A coverslip is generally superimposed on the hair shaft to facilitate reading under an optical microscope, using a liquid medium to fix the hair strands when conducting the evaluation is recommended.

To date, no standardization defines the best way to fix the hair shafts for reading under the microscope. A review of 76 articles indexed in PubMed with the keywords “trichogram” and “technique” published from 1970 to 2021 showed that only 14 studies (18.4%) mentioned some liquid or other fixation media when conducting the technique. Of these, one used formaldehyde (7.15%),⁵ two used a drop of Canadian balsam (14.28%),^{6,7} three used only a thin glass slide cover (21.42%),^{8,9,10} two used double-sided tape (14.28%),^{4,11} five used adhesive tape (37.71%),^{2,12,13,14,15} one used unspecified liquid (7.15%),¹⁶ and 62 (81.57%) did not mention or did not use any form of fixation of the hair strands.

A mixture of 45% acrylic resin and 55% xylenes (Eukitt®) can be used for fixing and reading the trichogram with excellent results (Figure 1A). It provides little formation of air bubbles (artifact) and facilitates exam interpretation, especially for inexperienced examiners. On the other hand, this technique is a more expensive option, and it's more challenging to be found in some parts of Brazil. In turn, the use of liquids that do not promote adherence of the hair strands to the glass slide – such as formaldehyde, 0.9% saline solution, and distilled water – facilitate the movement of hair strands on the slide, making it difficult to visually analyze and count the hairy roots in different optical fields.



FIGURE 1: Trichogram: assessment of hair shafts under an optical microscope (4x).
A - Evaluation with Eukitt®: transparent medium with minimal air bubbles formation (blue arrow).
B - Evaluation based on enamel: few air bubbles that do not affect the final assessment of the exam

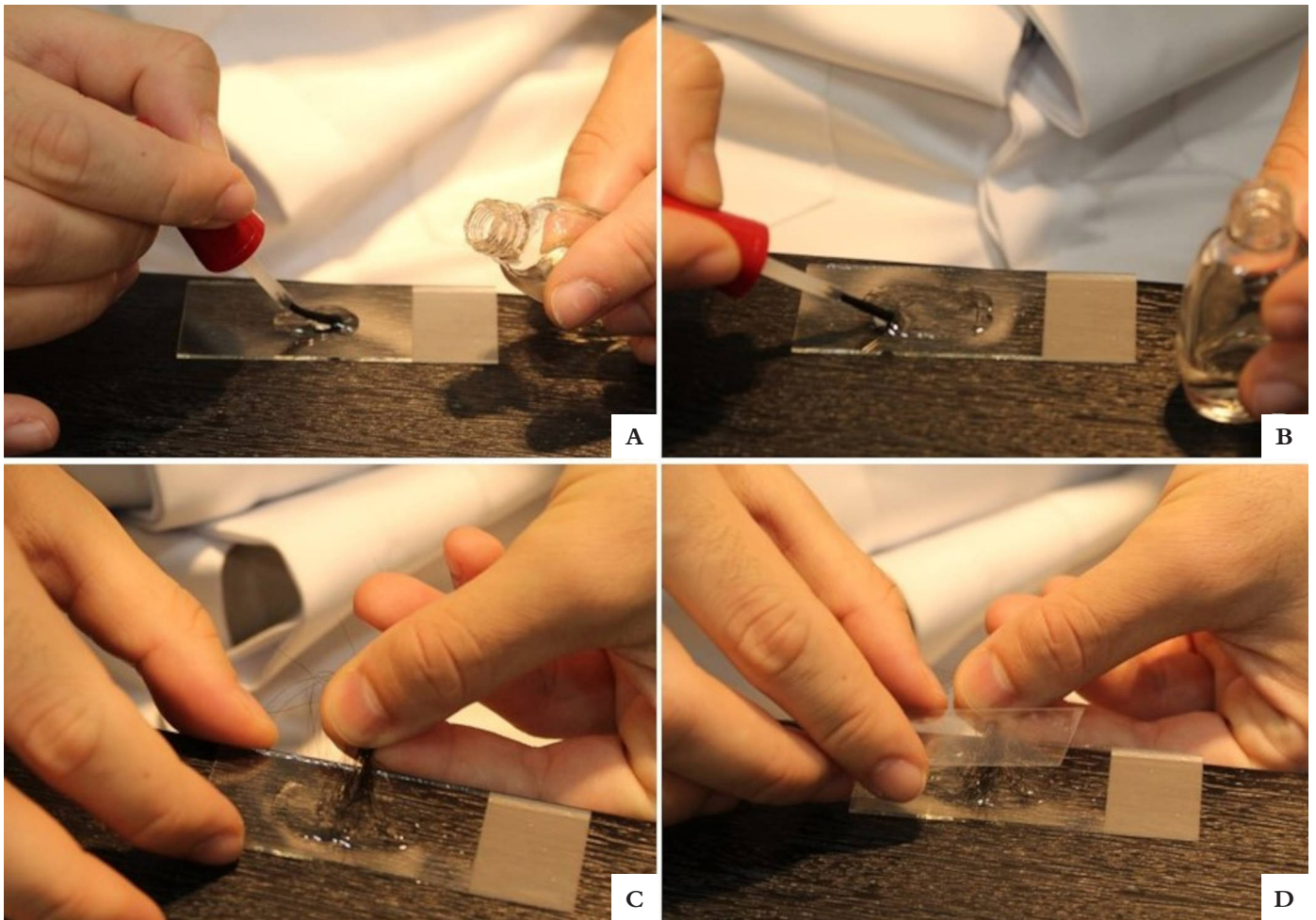


FIGURE 2: Preparation of enamel-based slide for trichogram reading. A good amount of base coat must be applied so that all hair shafts are fully soaked in the liquid **A** and **B** - Fixation must be quick, before the base coat dries, and a coverslip helps with further reading **C** and **D**.

In the authors' experience, using a transparent enamel base coat is a cheap, easy-to-access, and helpful strategy when preparing the hair shafts for the trichogram. However, we haven't found it in the literature among the various options. When opting for this strategy, the examiner must place the hair strands on a previously prepared slide with a generous amount of enamel base coat and then cover with a coverslip glass slide (Figures 2A - 2D). Drying is quick, and fixation is adequate, with minimal air bubbles formation (artifact) (Figure 1B). Also, the material can be kept for analysis on subsequent days.

CONCLUSION

Trichograms can be performed with or without liquid media, and to date, there is no standardization. However, using a colorless enamel base coat in exam preparation is a good practical option. It allows excellent fixation of the hair strands in the slide/coverslip interface, generates few air bubbles, and has fast drying and low-cost wide range availability nationwide. ●

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