



RAF RULE : A DOUBLE EDGE WEAPON

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KEYWORDS : NPC, NPA, Convergence insufficiency.

INTRODUCTION

RAF rule also known as Royal Air Force (RAF) rule is a commonly employed instrument in ophthalmology clinics to measure near point of convergence (NPC) and near point of accommodation (NPA) for diagnostic purpose and also used to provide therapeutic orthoptic exercises.¹⁻²

History

The RAF rule was first mentioned as "APPLIANCE THE R.A.F. NEAR-POINT RULE BY AIR VICE-MARSHAL J. C. NEELY in 1956".³

Parts³

a) Cheek rest

It is attached to one end of the rule. It is made of plastic and V-shaped notch in the center to fit the nose and allows the device to be comfortably placed on the subject's cheek, so that four-sided cubical drum comes to a position in the plane of the eyes. It is 6 cm in length, so value of distance on shaft is started from 6 cm.

Figure no 1.) Cheek rest



b) Target drums

RAF rule have a rotating four-sided cubical drum held on a slider. The slider is attached over a square section metal rule. Each of the four sides of drum has different targets with black prints on a white background which include:-

- 1) **Reduced Snellen chart**:- The distance Snellen chart is reduced to one-seventeenth of its actual size and is accurate at 35 cm. The reduced Snellen chart subtends an angle of 5 min of arc at 35 cm, the same that a distance Snellen chart subtends at 6 m.
- 2) **Section of the General Post Office (G.P.O.) telephone directory**:- One side consists of a photographed section of the G.P.O telephone directory.
- 3) **Times Roman typeface**:- The Faculty of Ophthalmologists suggested that the standard reading types should be (I) in "Times Roman"; (II) with "standard" spacing, (III) using printing sizes of 5, 6, 8, 10, 12, 14, 18, 24, 36 and 48 points, (IV) recorded for near as S5, S8 and so on⁴. Based on these recommendations one face consists of four lines: N5, N8, N10 and N12.

- 4) **A dot on a line**:- The fixation target to assess NPC is a small black dot in the centre of a vertical line.

Fig. no 2) Reduced snellen chart

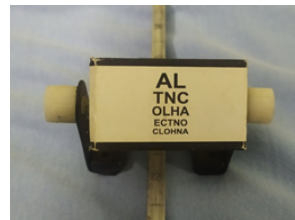


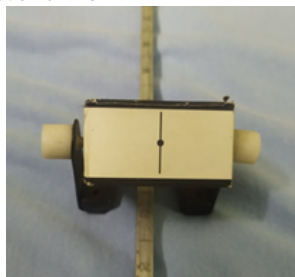
Fig. no 3) G.P.O. telephone directory



Fig. no 4) Times Roman typeface



Fig. no 5) Dot on a line



Drum sides 1, 2 and 3 are used for NPA measurement and side 4 is used for NPC measurement.

c) Square rule

This holds the drum and around 50 cm in length. This distance allows the measurement of NPC and NPA in presbyopes who prefer to read at 40 cm or more. The four sides of the square rule are marked differently as:-

- 1) A Centimeter scale with 2 cm increment.

- 2) A equivalent Dioptic power scale.
- 3) Expected Age scale.
- 4) A scale indicating the positions of normal and abnormal convergence.

Fig. no 6) Centimeter scale



Fig. no 7) Dioptic power scale

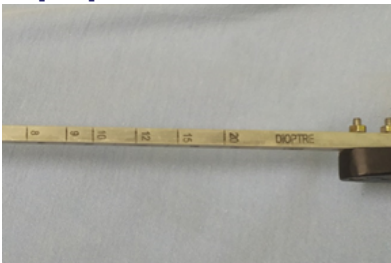


Fig. no 8) Age scale

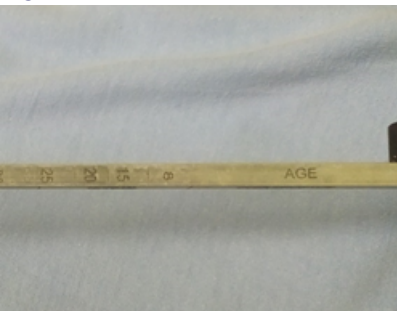


Fig. no 9) Convergence scale



Centimeter and convergence scale used to measure NPC & centimeter, dioptic power and age scale used to measure NPA.

d) Holder

To hold RAF Rule by examiner during measurement.

Fig. no 10) Holder at other end of RAF Rule



Measurement's

a) Near point of Convergence (NPC)

Measurement of both subjective and objective NPC is done by RAF Rule⁵ by using the dot on the line as standard target. Examiner holds the ruler in normal room illumination and gently places the cheek rest on the inferior orbital margin. NPC is most accurately measured by RAF Rule in depressed position of 45 degrees⁶. Then asked to patient to focus on the black dot and slowly moves the drum towards the patient's eyes at a constant rate of about 1-2 cm per second⁷.

The **subjective break point** is when the patient reports diplopia. The **recovery point** is noted when the patient reports single target when the slide is slowly moved back.

The **objective break point** is noted when the examiner notices that one or both eyes diverge from fixation or until the slider is stopped by the cheek rest and **recovery point** when both eyes regain focus on the target.

Repetition of test for measurement NPC is done 4 to 5 times as recommended by Wick and Mohindra *et al.*^{8,9} and 10 times as recommended by Scheiman *et al.*¹⁰

Normal value¹¹ = 5-10 cm (by objective method)
 < 20 cm (by subjective method)

In convergence insufficiency = 25-30 cm or more.

In RAF Rule there is convergence scale which can used directly to measure convergence status.

b) Near point of accommodation (NPA)

Measurement of NPA is done by using either Times roman typeface, Reduced snellen chart or G.P.O. telephone directory as standard target. Measurement is done with full refractive correction, first each eye separately and then both eye simultaneously. Procedure is similar as above and NPA is when the patient reports blurring of letters.

Normal value¹² = 7 cm at 10 year of age, 25 cm at 40 year of age and 33 cm at 45 year of age.

As there is age scale which can be used to correlate with patients age and dioptic power scale which gives value of amplitude of accommodation at that age group.

CONCLUSION

NPC and NPA is the primary finding for diagnosis of convergence insufficiency and anomalies of accommodation and RAF Rule is the traditionally used instrument for the measurement of both.

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