**Introduction**

Myopia is that diopteric condition of the eye, in which, with the accommodation at rest, incident parallel rays of light come to a focus anterior to light-sensitive layer of the retina.[1] It causes dimness of vision for distant objects as the only symptom noticed in majority of the patients. It is usually associated with an increase in axial length of the eyeball. Axial myopia is classified as simple and pathological myopia, of which simple (childhood) myopia is a common variety that commences between 5 and 13 years of age, progresses during the period of body growth with no major progression after 25 years of age.[2] When no progression occurs thereafter within a year, it is a stable myopia. Induced myopia is caused due to ocular inflammation, a debilitating disease and use of local or systemic pharmaceutical agents. It is transient in nature and regress when the cause is removed, otherwise myopia regression does not occur in children. Worldwide, there is an increase in incidence and progression of myopia. Its prevalence is considerably higher in Asian populations than in Europeans[3] and is increasing at a rapid rate.[4] Heredity, excessive near work, reduced scleral rigidity, hormonal changes, systemic diseases, diet, etc., were postulated as its aetiological factors. Different studies have reported higher myopia progression rates with earlier age of onset of myopia, greater amount of time spent on near work, shorter reading distance and less time spent on outdoor activities.[5] Individuals with myopia, especially of higher grade, have to face different problems such as medical, occupational and economic. Higher the grade of myopia more are the chances of complications such as myopic retinal degeneration.

**Effect of Homoeopathic preparation of *Ruta graveolens* on the progression of childhood myopia before, during and after cessation of treatment: A retrospective study**

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**Abstract**

**Background:** Increased incidence and progression of myopia, especially in Asian countries, have been attributed to excess near work. Topical use of *Atropine* was effective in controlling myopia but has got side effects and rebound effect after stopping the treatment. Homoeopathy mentions *Ruta graveolens* (*Ruta*) for myopia with its action on accommodation. **Aim:** The aim of the study is to evaluate the effect of *Ruta* on annual myopia progression rate (AMPR) before, during and after stopping treatment in childhood myopia. **Materials and Methods:** Ten cases of simple myopia in progressive stage aged 11–16 years were studied retrospectively. Myopia or spherical equivalent of refraction (SER) and AMPR in diopeters (D) before treatment were assessed from the previous refraction reports. *Ruta* 3C was used in BD dose orally for 2 years with a gap of 7 days after every 21 days, and thereafter, treatment was discontinued. Subjective refraction on Snellen’s chart at the start, during and after stopping treatment was recorded. From SER values, AMPR at different phases of study was assessed and analysed with paired *t*-test. **Results:** Mean AMPR before treatment was −1.10 D (±0.53). After *Ruta* treatment, there was a significant reduction of −0.27 D (±0.32) in AMPR (*t* = −4.13, *P* = 0.003). After stopping the treatment for an average of 10 months, mean AMPR was −0.46 D (±0.49), but this change was insignificant (*t* = 1.21, *P* = 0.26). **Conclusion:** Homoeopathic *Ruta* 3C was effective in controlling AMPR with no major progression after stopping the treatment.

**Keywords:** Annual myopia progression rate, Childhood myopia, Homoeopathy, *Ruta graveolens*
macular degeneration, retinal detachment and glaucoma which may cause blindness.[6] Many myopes are disqualified in service and its progression leads to financial burden due to frequent change of glasses. Hence, myopia not only creates a loss at personal level but also affects the economy and prosperity of the whole nation. Different measures used to control myopia include vision therapy techniques, use of optical devices and local use of modern medicines. In optical devices, controlled studies on use of bifocal and progressive spectacles for slowing progression of myopia had achieved a small treatment effect ranging from 0.15 to 0.50 D over 1.5–3 years.[7] However, treatment effect occurred in the initial period only. Myopia progression during the later period was at a similar rate as that of control. Effect of alteration of spectacle-wearing pattern on myopia progression has been evaluated in two studies. In one study, 43 myopics were categorised into four treatment groups as full-time spectacle wear, wear for distance viewing and then a switch to full-time wear, wear for distance viewing only and non-wear. Over a period of 3 years, no significant differences in refractive shifts between the treatment groups were noticed.[8] However, in other study, no significant differences in myopia progression in the different groups after 3 years in children were found who wear minus lenses with full correction for continuous use, wear full correction for distance vision only and those using bifocal lenses.[9] However, use of under-correction on myopia in two studies has shown either an increase in the progression of myopia or no change as compared to fully corrected controls.[10] Of different pharmaceutical agents, topical use of Atropine 1% was found effective in controlling myopia. However, it was not approved as standard treatment due to side effects, ethical issues associated with its long-term use and rebound effect after discontinuation of treatment.[5] Hence, there is a great need of research to have an effective, safe, economical and easy to use medical treatment to control myopia.

In Homoeopathic literature, different medicines have been mentioned for myopia. Of these, Ruta graveolens (Ruta) seems to have more similarity to myopia associated with near work due to its effect on accommodation and sclera. Allen has specifically mentioned ‘Ruta is valuable in weakness of accommodation, especially in near-sighted people.’[11] He also quoted a drug-proving symptom in a myopic prover as ‘He sees distant objects more distinctly than usual.’[12] Clarke has stated the ‘use of Ruta in ailments from overstraining eyes, from reading too much, especially fine work at night.’[13] Boger mentions affinity of Ruta for eye in general and sclerotic portion of the eye in particular.[14] Reduced rigidity of sclera is one of the important factors in incidence and progression of myopia, especially of hereditary one. Moffat and Norton have mentioned ‘Ruta is more often indicated in weakness of Ciliary muscles than internal recti.’[15,16] Ciliary muscles are used in the process of accommodation during near work. Different animal studies have shown that they become myopic when exposed to continuous retinal defocus, similarly human studies have observed reduced accommodative response in myopes as compared to emmetropes.[17,18] Hence, Ruta was considered for this study. A controlled clinical study of Ruta on myopia was conducted and has shown its controlling effect on myopia.[19] However, its effect after stopping the treatment was not studied. Hence, this retrospective study was done with an aim to evaluate the effect of Ruta on Annual Myopia Progression Rate (AMPR) before, during and after stopping the treatment in childhood myopia.

**Materials and Methods**

**Study design and settings**

This was a retrospective case series study of diagnosed cases of simple myopia in their progressive stage enrolled during the year 2005–2007, in the OPD of Sathye Eye Research Institute for Alternative Medicines, Pune, Maharashtra, India.

**Study population**

**Inclusion criteria**

Ten diagnosed cases of simple myopia in their progressive stage were enrolled. Children suffering from simple myopia in their progressive stage with availability of their previous refraction reports, from 6 months to 3 years before starting the treatment, children taking education, age group between 7 and 16 years with myopia or spherical equivalent of refraction (SER) from 1.0 to 6.0 diopters (D) and corrected visual acuity up to 6/6 on Snellen’s chart irrespective of gender, race and socioeconomic status, patients with normal ocular health other than myopia and in good general health with no history of cardiac or any major respiratory disease were included.

**Exclusion criteria**

- Individuals more than 16 years of age
- Individuals who had previous refraction reports of <6 months before starting the treatment.

**Intervention**

*Ruta 3C* was procured from a licensed homoeopathic pharmacy ‘Shrikrishna Homeo Pharmacy’ in Pune. It was given in a dose of four globules twice a day for the total duration of 2 years with a gap of 7 days after every 21 days. During treatment period, individuals were advised to use corrected glasses regularly, and no alteration in their diet and regimen was suggested.

**Study procedure**

Preliminary history of patients such as age, gender, amount of near-work activity in hours, their parental history of myopia and complaints were recorded from a case sheet. Patient’s haemogram and urine routine investigation findings were noted which were carried out before starting the treatment to know the fitness of patients. From patient’s previous refraction reports, refraction findings and their dates of examination were recorded. In eye examination, subjective refraction carried out on Snellen’s chart and finalised after doing a Duochrome test was noted.[20]
After completion of 2 years of *Ruta* treatment, patient’s blood (haemogram, serum creatinine, and serum glutamic-pyruvic transaminase [SGPT]) and urine investigation report findings were noted. After stopping the treatment, patients were advised to come for follow-up after 6 months to check their refraction and these findings were recorded.

**Outcome measure**
SER in diopters was an outcome measure that was assessed by subjective refraction. It is a spherical refraction plus half of cylindrical refraction.

**Statistical analysis**
Average of both eyes was used to evaluate the magnitude of change in refraction (SER), so the mean SER was calculated from right and left eye SER values. Mean change in SER before starting the treatment was calculated by subtracting SER value at the time of *Ruta* 3C intervention from SER value before starting the treatment for each participant by taking into consideration their previous older refraction report within last 3 years because from their refraction report of <6 months, we cannot judge properly their AMPR. From this change in SER value, AMPR in diopters (D) before starting the treatment was calculated by multiplying 12 months to mean change in SER value divided by number of months required to do this change in SER. It was calculated for each participant, and from AMPR values of 10 participants, an average rate was calculated. Mean change in SER during treatment was calculated by subtracting SER value after 2 years of treatment from SER at the start of treatment and then AMPR was calculated. In a similar way, change in SER after stopping the treatment was calculated by subtracting SER value after stopping the treatment for the average of 10 months from SER during 2 years of *Ruta* treatment. From this change in SER value and months of stopping the treatment, AMPR was assessed. Results on AMPR before, during and after stopping the treatment was analysed with a paired *t*-test and probability value (*P*) of <0.05 was considered statistically significant.

**RESULTS**
A total of 19 patients who came for follow-up after cessation of *Ruta* treatment were assessed for eligibility. Out of these, four subjects were excluded due to following reasons: One subject was >16 years age, and in three subjects, refraction reports before starting treatment were of <6 months from their time of enrolment. Out of five subjects who were excluded after stopping *Ruta* treatment, two were shifted to constitutional homoeopathic treatment before 6 months due to moderate grade of myopia, while three subjects had follow-up after 18 months [Figure 1].

In the present study, a total of 10 subjects, 6 males and 4 females, were taken for analysis with a mean age of 12.9 years (±1.91). History of myopia in parents was noticed in seven children. They had a mean near-work activity of 4.9 h (±1.91). The mean myopia (SER) before starting the treatment was −2.52 D (±1.25), while at the start of treatment, it was −3.96 D (±1.21).

The mean change in SER before starting treatment was −1.44 D (±0.57) that has occurred in average of 18 months (±7.86). Hence, the mean AMPR was −1.10 D (±0.53). After 24 months of *Ruta* treatment, the mean SER was −4.51 D (±1.60) and the mean change in SER was −0.54 D (±0.64). Hence, the mean AMPR was −0.27 D (±0.32). This marked reduction or difference in AMPR before and after *Ruta* treatment of −0.83 D was statistically significant (*P* = 0.003). Mean SER after stopping *Ruta* treatment was −4.96 D (±1.72), so the mean change in SER after stopping treatment was −0.46 D (±0.51) that has occurred in the average of 10 months (±3.59). The mean AMPR after stopping treatment was −0.46 D (±0.49). The difference in progression rate during and after stopping the treatment of 0.19 D was not found to be significant (*P* = 0.26).

Out of 10 subjects, AMPR in 7 was ≥−0.75 D before starting the treatment, whereas during *Ruta* treatment, AMPR was <−0.5 D in majority (8) of the subjects. After stopping the treatment, AMPR was ≤−0.5 D in majority (8) of subjects, and only in 2 subjects, it was > 0.5 D. Table 1 summarizes the myopia and AMPR in individual subject at different phases of study. Tables 2 and 3 depict the outcome of treatment on AMPR and Table 1 summarizes the myopia and AMPR in individual subject at different phases of study. Table 2 and 3 depict the outcome of treatment on AMPR and Figure 2 shows the graph of mean AMPR before, during and after stopping the treatment. When the difference in AMPR before and after *Ruta* treatment was assessed, it was observed that in six subjects, there was a reduction in AMPR by >0.5 D after *Ruta* treatment.

During 2 years of *Ruta* treatment, no adverse effects related to *Ruta* 3C were observed in subjects. Similarly, blood and urine
Table 1: Myopia and annual myopia progression rate in individual subject at different phases of study

<table>
<thead>
<tr>
<th>Age/gender</th>
<th>Myopic parents</th>
<th>Near work (h)</th>
<th>Myopia duration (months)</th>
<th>SER start treatment (D)</th>
<th>AMPR (D)</th>
<th>Stopped treatment (months)</th>
<th>SER change 2 years (D)</th>
<th>AMPR (D)</th>
<th>Stopped treatment (months)</th>
<th>SER mean (D)</th>
<th>AMPR (D)</th>
<th>Stopped treatment (months)</th>
<th>SER mean (D)</th>
<th>AMPR (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/male</td>
<td>Present</td>
<td>5</td>
<td>9.0</td>
<td>−2.50</td>
<td>−2.00</td>
<td>−0.50</td>
<td>−2.50</td>
<td>−2.00</td>
<td>−0.50</td>
<td>−2.00</td>
<td>−0.50</td>
<td>−2.00</td>
<td>−2.00</td>
<td>−0.50</td>
</tr>
<tr>
<td>11/male</td>
<td>Absent</td>
<td>5</td>
<td>7.0</td>
<td>−4.94</td>
<td>−1.60</td>
<td>−0.88</td>
<td>−1.60</td>
<td>−0.88</td>
<td>−1.60</td>
<td>−0.88</td>
<td>−1.60</td>
<td>−0.88</td>
<td>−0.88</td>
<td>−1.60</td>
</tr>
<tr>
<td>13/female</td>
<td>Absent</td>
<td>5</td>
<td>21.0</td>
<td>−5.25</td>
<td>−1.50</td>
<td>−0.88</td>
<td>−1.50</td>
<td>−0.88</td>
<td>−1.50</td>
<td>−0.88</td>
<td>−1.50</td>
<td>−0.88</td>
<td>−0.88</td>
<td>−1.50</td>
</tr>
<tr>
<td>14/female</td>
<td>Present</td>
<td>3</td>
<td>14.0</td>
<td>−2.07</td>
<td>−1.50</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>16/female</td>
<td>Present</td>
<td>3</td>
<td>18.0</td>
<td>−4.88</td>
<td>−1.17</td>
<td>−0.50</td>
<td>−1.17</td>
<td>−0.50</td>
<td>−1.17</td>
<td>−0.50</td>
<td>−1.17</td>
<td>−0.50</td>
<td>−0.50</td>
<td>−1.17</td>
</tr>
<tr>
<td>13/male</td>
<td>Present</td>
<td>3</td>
<td>26.0</td>
<td>−4.13</td>
<td>−0.87</td>
<td>−1.63</td>
<td>−0.87</td>
<td>−1.63</td>
<td>−0.87</td>
<td>−1.63</td>
<td>−0.87</td>
<td>−1.63</td>
<td>−1.63</td>
<td>−0.87</td>
</tr>
<tr>
<td>16/male</td>
<td>Present</td>
<td>9</td>
<td>16.0</td>
<td>−5.25</td>
<td>−0.75</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>12/male</td>
<td>Absent</td>
<td>7</td>
<td>19.0</td>
<td>−4.38</td>
<td>−0.63</td>
<td>−1.25</td>
<td>−0.63</td>
<td>−1.25</td>
<td>−0.63</td>
<td>−1.25</td>
<td>−0.63</td>
<td>−1.25</td>
<td>−1.25</td>
<td>−0.63</td>
</tr>
<tr>
<td>11/male</td>
<td>Present</td>
<td>4</td>
<td>16.0</td>
<td>−2.50</td>
<td>−0.56</td>
<td>−0.25</td>
<td>−0.56</td>
<td>−0.25</td>
<td>−0.56</td>
<td>−0.56</td>
<td>−0.25</td>
<td>−0.56</td>
<td>−0.56</td>
<td>−0.25</td>
</tr>
<tr>
<td>12/male</td>
<td>Present</td>
<td>5</td>
<td>34.0</td>
<td>−3.75</td>
<td>−0.44</td>
<td>−0.25</td>
<td>−0.44</td>
<td>−0.25</td>
<td>−0.44</td>
<td>−0.25</td>
<td>−0.44</td>
<td>−0.25</td>
<td>−0.25</td>
<td>−0.44</td>
</tr>
</tbody>
</table>

SER: Spherical equivalent of refraction; AMPR: Annual myopia progression rate

Table 2: Outcome of annual myopia progression rate in diopters before and during Ruta treatment

<table>
<thead>
<tr>
<th>Annual Myopia Progression Rate</th>
<th>Mean±SD</th>
<th>AMPR before treatment (n=10)</th>
<th>AMPR during treatment (n=10)</th>
<th>Difference (95% CI)</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPR (D)</td>
<td>−1.10±0.53</td>
<td>−0.27±0.32</td>
<td>−0.83 (−1.28−−0.38)</td>
<td>−4.13</td>
<td>0.003</td>
<td></td>
</tr>
</tbody>
</table>

SD: Standard deviation; AMPR: Annual myopia progression rate; CI: Confidence interval

Table 3: Outcome of annual myopia progression rate in diopters during and after stopping Ruta treatment

<table>
<thead>
<tr>
<th>Annual Myopia Progression Rate</th>
<th>Mean±SD</th>
<th>AMPR during treatment (n=10)</th>
<th>AMPR during treatment and after stopping treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMPR (D)</td>
<td>−0.27±0.32</td>
<td>−0.46±0.49</td>
<td>0.19 (−0.16-0.55)</td>
</tr>
</tbody>
</table>

SD: Standard deviation; AMPR: Annual myopia progression rate; CI: Confidence interval

investigation reports that were available for four subjects were found within normal limits.

**DISCUSSION**

The results of this study show that use of *Ruta* 3C in BD dose for 2 years has reduced significantly the AMPR by −0.83 D as compared to the rate before starting the treatment without any untoward effects. This study also showed that even after stopping *Ruta* treatment myopia has progressed at much lower rate by 19.0 D/year even though it was not statistically significant. This shows that *Ruta* can be an effective treatment in controlling myopia and its effect persists even after stopping the treatment.

*Ruta* 3C has probably acted on ciliary muscles, thereby improving accommodation in myopes, leading to proper focusing of an image on the retina even during excessive near work. This might have resulted in slowing myopia progression. In animal model, retinal defocus developed by wearing negative lenses has resulted in the development of myopia. After stopping *Ruta* treatment, there was a slight increase in myopia, and probably, it is due to hereditary factor in background in these subjects that makes them susceptible for myopia progression when exposed to excessive near work. To tackle this problem, a constitutional line of treatment has to be planned after stopping *Ruta* treatment.
AMPR is known to vary with age, use of corrective glasses, hours of near work, outdoor activity, parental myopia, overall nutrition levels, etc. In this study, all subjects were advised to use corrected glass on a regular basis and no alteration in diet and regimen (exercise) were suggested. Similarly, no children in this study were involved in outdoor (sports) activity. Thus, these factors play no role in affecting AMPR during \textit{Ruta} treatment whereas amount of near work in hours and parental history of myopia were considered in this study as they decide the rate of myopia progression.

In this study, it was observed that in 6 out of 10 subjects, there was a reduction in AMPR by >0.5 D after \textit{Ruta} treatment as compared to the rate before starting the treatment. This benefit was observed among all age groups, both gender and in children with parental myopia as well as no parental history of myopia. However, four subjects who were less benefitted by treatment were children of younger age group of ≤13 years and three had parental history of myopia. This shows that \textit{Ruta} probably had less effect on myopia that usually starts at an early age which is usually governed by heredity.

In controlled clinical trials, topical use of \textit{Atropine} 1\% has shown a significant reduction in myopia progression after 2 years treatment. However, after cessation of treatment for 1 year, the mean progression in the \textit{Atropine}-treated group was −1.14 ± 0.80 D, whereas in placebo-treated group, the mean progression was −0.38 ± 0.39 D.\cite{21} However, in \textit{Ruta} study after cessation of treatment, there was no rebound effect but a slow progression of myopia of −0.46 D/year which is much less as compared to \textit{Atropine}. This shows that a oral route of administration of medicine is more useful in myopia control than topical use.

Minimum baseline level of myopia of −0.5 D and baseline set of associated factors such as measurement of axial length of eyeball in mm, power of accommodation in diopters and treatment duration of minimum 1 year should be considered in the study so as to justify the effect of pharmacological intervention in controlling myopia. Worldwide mean rate of myopia progression in children between 8 and 13 years of age is estimated as −0.5 D per year, whereas in Asian children, it is −0.8 D per year.\cite{10} Hence, the minimum myopia progression rate of −0.5 D/year in Asian children can justify myopia control by therapeutic intervention, whereas myopia progression of <−0.5 D/year is considered as a pharmacological success in slowing down the progression of myopia.

Patient’s haemogram and urine routine investigation findings that were carried out before starting the treatment as systemic infections, worm infestations, anaemia, etc., are common conditions in childhood that are known to cause a transient myopia or lead to an increase in existing myopia.\cite{22} Hence, haemogram and urine routine examination were advised to all patients under the study. Similarly, after completion of 2 years \textit{Ruta} treatment, patient’s haemogram, serum creatinine, SGPT and urine routine investigation were advised to rule out any hepatic and renal toxicity of \textit{Ruta}.

In this study, \textit{Ruta} was used in low (3C) potency because of following reasons:

Myopia is associated with the changes in structure or shape of eye ball (increased axial length), so it is not a functional disease. Myopia is a disease localized to a single organ (eye) with only organ symptoms. Majority of the patients do not have any peculiar ocular symptoms except dimness of vision for distant objects. \textit{Ruta} was prescribed for its action on particular part of the eye (ciliary muscles), and when a remedy is prescribed only for a particular effect, the potency that acts best is the one in lower range.\cite{22} \textit{Ruta} prescription was based on its local effect and not on any characteristic particular or general symptoms in myopic individuals so was used in lower potency. \textit{Ruta} was prescribed by taking into account its particular effect on ciliary muscle (accommodation) and sclera so was used as an organ remedy. \textit{Ruta} was prescribed with an intention to reduce daily ocular stress which the children are constantly exposed to, during their competitive education.

Strength of this study is that effect of \textit{Ruta} in individuals suffering from simple progressive myopia has been evaluated completely by taking into account the AMPR before, during and after stopping the treatment. We should know the rate of myopia progression before starting the treatment in a myopic individual as there is much variation in the rate in Asian children than their western counterparts.\cite{23} Similarly, myopia progression after cessation of treatment is also an important factor to study so as to know the long-term effect of treatment on myopia and also rebound effect after discontinuing the treatment. These parameters were not considered in majority of international myopia studies.

A small sample size, lack of refraction of eye at a regular intervals and no measurement of axial length after stopping \textit{Ruta} treatment and no control group were the major limitations. Hence, a multicentric, randomized, double-blind, controlled clinical study in large sample and in different races and objective tests such as measurement of axial length, accommodation and sclera rigidity will reveal the mechanism of action of \textit{Ruta} on myopia. Similarly, a future study after stopping \textit{Ruta} treatment with 3 monthly examinations will help to know its long-term effects on myopia.

**Conclusion**

\textit{Ruta} 3C in BD dose over 2 years was effective in controlling AMPR and its effect persisted even after stopping the treatment for the average of 10 months.

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Conflicts of interest
None declared.

REFERENCES
Epidemiologic study of ocular refraction among schoolchildren in
5. Grosvenor T, Goss DA. Clinical Management of Myopia. Boston:
6. Pan CW, Ramamurthy D, Saw SM. Worldwide prevalence and risk
8. Ong E, Grice K, Held R, Thorn F, Gwiazda J. Effects of spectacle
accommodation on myopic progression: Final results of a three-year
randomised clinical trial among schoolchildren. Br J Ophthalmol
9. Cooper J, Schulman E, Jamal N. Current status on the development and
10. Allen TF. Handbook of Materia Medica and Homoeopathic Therapeutic.
14. Moffat JL. Homoeopathic Therapeutics in Ophthalmology. New Delhi:
16. Rosenfield M. Accommodation and myopia. In: Rosenfield M, Gilmartin B,
17. Wallman J, Nickla DL. The relevance of studies in chicks for
understanding myopia in humans. In: Beuerman RW, Saw SM, Tan DT,
Wong TY, editors. Myopia: Animal Models to Clinical Trials. Singapore
18. Grover RS. Annual rate of myopia progression before and after treatment
with Ruta graveolens in simple myopia: A controlled clinical study.
Atropine for the treatment of childhood myopia: Effect on myopia
22. Khoo CY, Ng RF. Methodologies for interventional myopia studies. Ann

Sathye: Effect of Ruta on childhood myopia: A retrospective case series

None declared.

Conflicts of interest
Nil.

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REFERENCES
Epidemiologic study of ocular refraction among schoolchildren in
5. Grosvenor T, Goss DA. Clinical Management of Myopia. Boston:
6. Pan CW, Ramamurthy D, Saw SM. Worldwide prevalence and risk
8. Ong E, Grice K, Held R, Thorn F, Gwiazda J. Effects of spectacle
accommodation on the progression of myopia in children. Optom Vis Sci
9. Pärssinen O, Hemminki E, Klemetti A. Effect of spectacle use and
accommodation on myopic progression: Final results of a three-year
randomised clinical trial among schoolchildren. Br J Ophthalmol
10. Cooper J, Schulman E, Jamal N. Current status on the development and
11. Allen TF. Handbook of Materia Medica and Homoeopathic Therapeutic.
15. Moffat JL. Homoeopathic Therapeutics in Ophthalmology. New Delhi:
17. Rosenfield M. Accommodation and myopia. In: Rosenfield M, Gilmartin B,
18. Wallman J, Nickla DL. The relevance of studies in chicks for
understanding myopia in humans. In: Beuerman RW, Saw SM, Tan DT,
Wong TY, editors. Myopia: Animal Models to Clinical Trials. Singapore
19. Sathye SS. Annual rate of myopia progression before and after treatment
with Ruta graveolens in simple myopia: A controlled clinical study.
Atropine for the treatment of childhood myopia: Effect on myopia
23. Khoo CY, Ng RF. Methodologies for interventional myopia studies. Ann
Sathye: Effect of *Ruta* on childhood myopia: A retrospective case series

**Wirkung des homöopathischen Mittels *Ruta graveolens* auf das Fortschreiten der Myopie bei Kindern vor, während und nach Ende der Behandlung: Eine retrospektive Studie**

**Hintergrund:** Es ist ein weltweiter Anstieg, insbesondere in asiatischen Ländern, von Kurzsichtigkeit und eine erhöhte Inzidenz sowie Progression, die auf übermäßiges “Near Work” zurückzuführen ist, zu verzeichnen. Die topische Anwendung des modernen Arzneimittels Atropin war bei der Eindämmung der Kurzsichtigkeit wirksam, hat aber Nebenwirkungen und einen Rebound-Effekt nach dem Behandlungsende. In der Homöopathie wird *Ruta graveolens* (*Ruta*) bei Kurzsichtigkeit mit seiner Wirkung auf die Akkomodation erwähnt.

**Ziel:** Das Ziel der Studie ist es, die Wirkung von *Ruta* auf die jährliche Myopie-Progressionsrate (AMPR) vor, während und nach Beendigung der Behandlung bei Myopie in der Kindheit zu bewerten.


**Ergebnisse:** Die mittlere AMPR vor der Behandlung betrug -1,10 D (± 0,53). Nach der *Ruta*-Behandlung gab es eine signifikante Reduktion von -0,27 D (± 0,32) in AMPR (t = -4,13, P = 0,003). Nach einem durchschnittlichen Behandlungszeitraum von zehn Monaten (± 3,59) lag die mittlere AMPR bei -0,46 D (± 0,49), aber diese Änderung war nicht signifikant (t = 1,21, P = 0,26).

**Fazit:** Das homöopathische Arzneimittel *Ruta C 3* zeigte seine Wirkung bei der Kontrolle von AMPR ohne wesentliche Progression nach Beendigung der Behandlung.

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**Resumen**

**Fundamentos:** El incremento de la incidencia y progresión de la miopía en todo el mundo, sobre todo en los países asiáticos, se atribuye al trabajo a corta distancia. El uso tópico del medicamento moderno atropina ha sido eficaz en controlar la miopía, pero tiene efectos secundarios, así como efectos de rebote tras interrumpir el tratamiento. La homeopatía menciona *Ruta graveolens* (*Ruta*) para la miopía por su acción en la acomodación.

**Objetivo:** El objetivo del estudio es evaluar el efecto de *Ruta* en la tasa anual de progresión de la miopía (TAPM) antes, durante y después de interrumpir el tratamiento. La homeopatía menciona *Ruta graveolens* (*Ruta*) para la miopía por su acción en la acomodación.

**Materiales y métodos:** Se estudiaron retrospectivamente diez casos (pacientes de 11 – 16 años) con miopía simple en estadio progresivo. A partir de los informes de refracción previos, se evaluaron la miopía o el equivalente esférico de refracción (ESR) y la TAPM en dioptrías (D) antes del tratamiento. Se administró *Ruta C 3* a una dosis oral de dos veces al día durante 2 años con un intervalo de 7 días tras cada 21 días, y después se interrumpió el tratamiento. Se registró la refracción subjetiva en el gráfico de Snellen al principio, durante y después de interrumpir el tratamiento. En las diferentes fases del estudio se evaluaron y analizaron los valores ESR y TAPM con la prueba t pareada.

**Resultados:** La TAPM media antes del tratamiento fue de −1,10 D (±0,53). Tras el tratamiento con *Ruta*, se produjo una reducción significativa de −0,27 D (± 0,32) en la TAPM (t = −4,13, P = 0,003). Tras interrumpir el tratamiento durante un promedio de 10 meses (± 3,59), la TAPM media fue de −0,46 D (± 0,49), pero este cambio no fue significativo (t = 1,21, P = 0,26).

**Conclusiones:** *Ruta C 3* homeopática fue eficaz en controlar la TAPM sin una progresión importante tras interrumpir el tratamiento.
Effects of the homoeopathic preparation *Ruta graveolens* on the progression of childhood myopia: A retrospective case series

**Background:** In the world, the increase in the incidence and progression of myopia, especially in Asian countries, has been attributed to excessive near work. The usage of *atropine*, a modern medicine used locally, has been found to be effective in controlling myopia but has side effects and causes rebound effect after the treatment. Homoeopathic texts recommend *Ruta* in myopia due to its action on accommodation.

**Objective:** The objective of this study was to evaluate the effect of *Ruta* on the annual rate of progression of childhood myopia (AMPR) before, during, and after the treatment.

**Materials and Methods:** Ten cases of simple myopia progressing at ages 11 to 16 years were studied retrospectively. The myopia or the spherical equivalent refraction (SER) and AMPR in dioptres (D) before the treatment were evaluated using previous refractive reports. The *Ruta* 3C was administered orally twice a day for 2 years with a break of 7 days every 21 days. Treatment was then stopped. The subjective refraction was measured on the Snellen chart at the start, during, and after the treatment. From the SER values, the AMPR was evaluated and analyzed at different phases of the study using paired t-tests.

**Results:** The AMPR mean before the treatment was −1.10 D (±0.53). After the treatment with *Ruta*, a significant reduction of −0.27 D (±0.32) was noted in the AMPR values (t = −4.13, P = 0.003). During an average period of 10 months (±3.59) after the treatment, the AMPR mean was −0.46 D (±0.49), but this change was negligible (t = 1.21, P = 0.26).

**Conclusion:** The homoeopathic medicine *Ruta* 3C was effective in controlling the AMPR and no major progression was noted after the treatment.