CHAPTER 8

DISCUSSION
The data collected for IRTIS recordings and blood tests were showing interesting changes after the study. Student paired ‘t’ test is used to analyze and interpret the data obtained for IRTIS recordings and blood tests. The result is also analyzed by graphical methods.

The experimental group has shown highly significant reduction in the mean thermal temperatures (TT) in the IRTIS readings of a spot (near supra-orbital foramen) in frontal sinus area (say ‘spot 1’) in both right and left frontal sinuses from 33.10°C to 32.56°C and from 33.17°C to 32.62°C with t stat = 3.3246, p =0.0036 and t stat = 3.0246, p =0.007 respectively. This shows a significant difference between the IRTIS thermal temperatures in ‘spot 1’ for experimental group before and after the study. Therefore, the first null hypothesis, “there will be no significant difference between the IRTIS thermal temperatures in ‘spot 1’ before and after the study”, is rejected with respect to Experimental group. The decrease in the IRTIS readings indicates the reduction in inflammation of the sinuses. However naturally there is a variation of temperature in different parts of the body. Similarly, other external facts may also affect the body temperature. Whenever there is an external influence on the body, naturally it will affect on the frontal sinus area and near by areas also. Therefore, the TT variation will be same in frontal sinus areas and near by areas due to external facts. To nullify the variation due to above factors, the difference between the TT of ‘spot 1’ and a near by spot, say ‘spot 2’ (about 1.5c.m upward vertical distance from spot 1) were calculated by recording the TT of these two spots. The difference of TT between these points
can nullify the external influence up to large extent. The experimental group has shown highly significant reduction in the TT difference of IRTIS readings, from $1.149^0C$ to $0.202^0C$ and from $1.135^0C$ to $0.2545^0C$ with $t$ stat $= 9.5788$, $p < 0.001$ and $t$ stat $= 8.362$, $p < 0.001$ for right and left frontal sinuses respectively. This shows a significant difference between the IRTIS thermal temperatures of ‘spot 1 & spot 2 difference’ for experimental group before and after the study. Therefore, the second null hypothesis, “there will be no significant difference between the IRTIS thermal temperatures of ‘spot 1 & spot 2 difference’ before and after the study”, is rejected with respect to Experimental group. Symptomatically all the subjects in experimental group got relief from sinusitis. This symptomatic improvement is statistically proved by the readings of IRTIS. The least square graph and smooth graphs for IRTIS recording show clear cut difference after yoga therapy. The graphical methods clears that TT difference is more appropriate measure to show the extent of improvement attained by yoga therapy. Thus the IRTIS scientifically proved the improvement in Sinusitis by Yoga therapy.

It is important to note that the improvement in IRTIS readings were also correlated with the significant change in the blood test readings. The total white blood cell count (T.C) decreased significantly from 7783.25/ml to 6772.5/ml with $t=2.1191$ and $p=0.0475$. This clearly shows a reduction in inflammation and improvement in immune system. The ESR also significantly reduced from 14.2 mm/hr to 9.5 mm/hr with $t$ stat $= 4.3085$, $p= 0.0004$ indicating a significant reduction in the inflammation. Neutrophil percentage has been
normalized with $t=3.9994$ and $p=0.0007$. Lymphocytes percentage has been decreased from 37.7857 to 34.5 with $t = 3.4374$, $p= 0.0028$ indicating a reduction in the infections. Eosinophils percentage significantly reduced from 4.4 to 3.3 with $t = 2.7277$, $p= 0.0134$ indicating a reduction in the allergic reaction and an increase in body resistance to the allergens. Above discussion shows there is a significant difference between the blood tests for ESR, TC and DC of Experimental group before and after the study. Therefore, the third null hypothesis “there will be no significant difference between the blood tests for ESR, TC and DC before and after the study” is rejected with respect to experimental group. Significant improvement in blood test suggests the improvement in Sinusitis condition. Graphical analysis also shows clear improvement for ESR, T.C. and D.C. Thus the significant improvement in IRTIS recordings for the symptomatic improvement after yoga therapy in Sinusitis subjects of Experimental group is justified by blood tests also.

Above statistically significant changes for IRTIS recordings and blood tests were not seen in control group. There is no significant change in mean TT of control group at spot1 in right and left frontal sinuses (before=33.23°C; after=33.19°C & before=33.18°C; after=33.08°C) with $t = 0.3235$, $p =0.7499$ and $t = 0.6451$, $p =0.5266$ respectively. Therefore, the first null hypothesis, “there will be no significant difference between the IRTIS thermal temperatures in ‘spot 1’ before and after the study”, is accepted with respect to Control group. Control group has got statistically non significant values for TT difference (before=0.8495°C; after=0.9535°C & before=0.7635°C;
after=0.7675°C) with t stat = 1.2845, $p = 0.2144$ and t stat = 0.0557, $p = 0.9562$ respectively for right and left frontal sinuses. Therefore, the second null hypothesis, “there will be no significant difference between the IRTIS thermal temperatures of ‘spot 1 & spot 2 difference’ before and after the study”, is accepted with respect to Control group. Similarly all the statistical values for ESR, T.C and D.C were non significant in the case of control group. Therefore, the third null hypothesis “there will be no significant difference between the blood tests for ESR, TC and DC before and after the study” is accepted with respect to Control group. The control group does not show any significant changes in graphical analysis too. The least square and smooth graph drawn for IRTIS readings and blood tests in the case of control group do not show any clear changes after study period.

Above discussion based on the data obtained clears that yoga therapy helped to relieve the inflammation of sinusitis and improved the resistance of the body against the causative factors in experimental group. In the present study, it is important to observe that the improvement is clearly proved by Infra Red Thermal Imaging System. There is no such instrument which can assess the improvement in the treatment of sinusitis. Thus the research study scientifically proved that the effect of yoga therapy on sinusitis can be assessed by using IRTIS. Hence IRTIS, a totally non-invasive method can be used as an effective tool to assess the efficacy of yoga therapy.

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