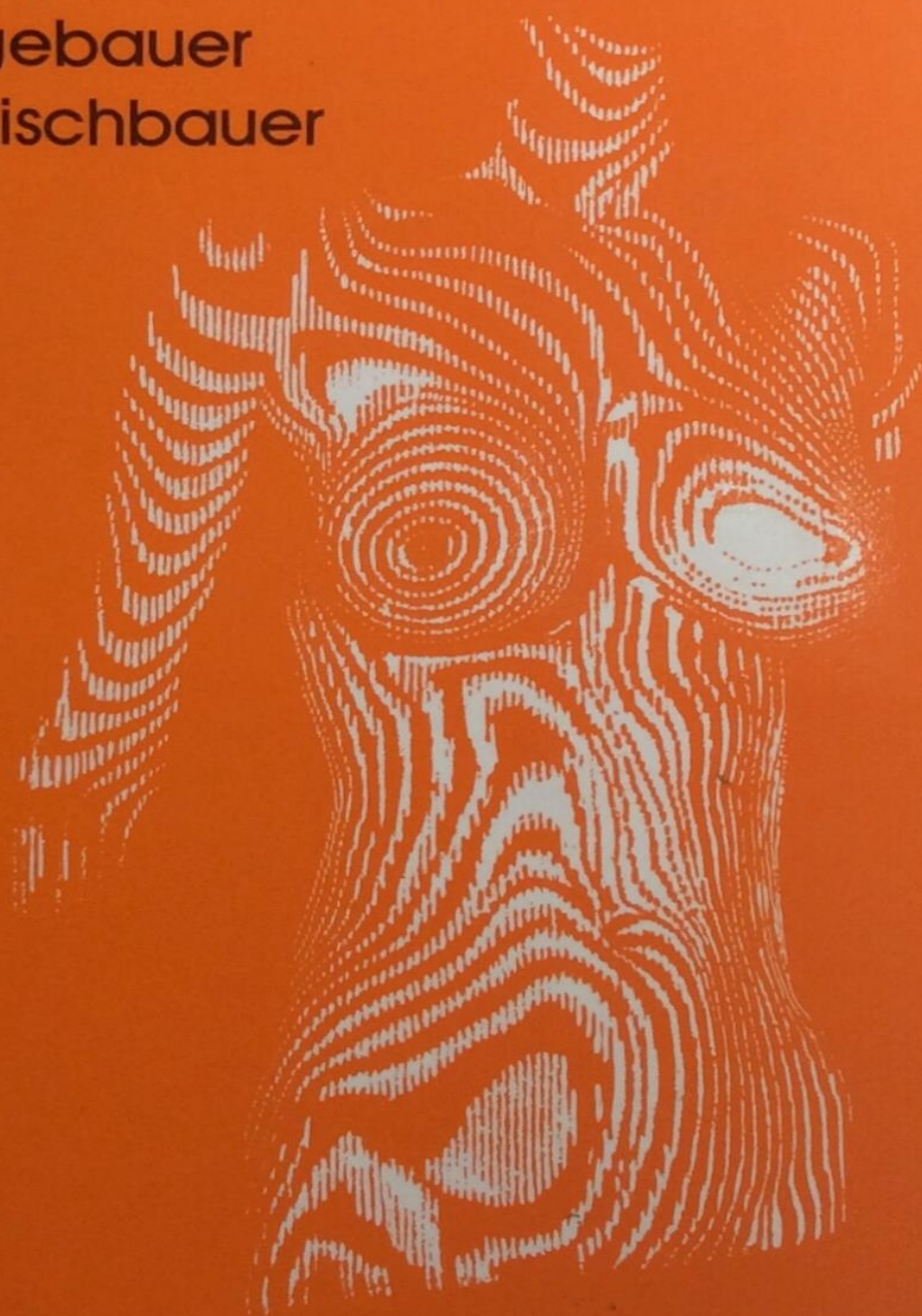


# Surface Topography and Body Deformity

Edited by  
H. Neugebauer  
G. Windischbauer



Gustav Fischer Verlag

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Edited by  
Hermann Neugebauer and Gerhard Windischbauer

4 colour-plates, 191 figures and 26 tables



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## Comparison of side moiré topographs of children in standing, sitting and bending positions

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### Abstract

*Moiré topography is being increasingly used in the study of scoliosis. For a child suffering from scoliosis moiré topographs on the two halves of the back are not similar. Since scoliosis is a lateral curvature of the spinal column it should also effect moiré topographs of the side. The effect is expected to be more prominent when the child is examined in the forward bending position. This paper reports an ongoing study which will include side moiré topographs of one hundred normal, healthy eight to ten years old boys studying in a local school in Hyderabad.*

### Introduction

Different noninvasive methods used for the documentation of spinal deformity have helped a lot in understanding the nature of diseases like scoliosis and kyphosis. Moiré topography is now routinely used in the screening of scoliosis in many countries. Most of these studies are concerned with the topographs of the back. However, with the interest in scoliosis there is suddenly an interest in kyphosis and sagittal plane deformities. Moreover, spinal deformity is a three-dimensional problem. Three-dimensional models of spine have been developed by various groups (e.g. Hierholzer and Lüxmann 1982; Kamal 1982; 1983; 1987). Some studies have already included side topographs (Suzuki, Armstrong and Armstrong 1981; Kamal and El-Sayyad, 1981).

There is a need for a detailed study of side topographs of healthy children to provide reference for scoliotic patients. With the interest in comparing back moiré topographs of children (Kamal, Bukhari and Akram 1988) it is of interest to compare also the side moiré topographs of children in the standing and sitting positions. During the forward bend test the level of scapula does not remain same for a scoliotic patient. Bulging on one side or the back would also have

a prominent effect on the side topograph taken during the forward bending position. Therefore there is a need of studying side topographs of children in the standing, sitting and forward bending positions.

### Experimental

We are studying side topographs of children in the standing, sitting and forward bending positions. The moiré set up is described elsewhere (Kamal, Bukhari and Akram 1988). The children are 8 to 10 years old boys studying in a local school in Hyderabad. The children come from a representative group of children in an urban population in Pakistan. Each child is given a bending test and marked on side. With a skin marker two marks are made, one at the level of nipples and the other at the level of naval. The child is asked to stand relaxed looking straight ahead with arms held in front and his moiré photograph is taken. Then the child is seated with arms held in front and his picture taken. Finally the child is asked to touch (or try to touch) his toes behind the moiré screen and his moiré topograph is obtained. These three moiré photos for each child are compared to find any significant changes in these positions in normal, healthy children.

### Conclusions

This study involving side topographs of healthy children will provide a database to compare with side topographs of scoliotic patients. During the sitting and standing positions, the forces on the spinal column are almost same and so the side topographs are not expected to be very much different. However, in the bending position the

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structure changes significantly and so the side topographs are expected to be different. Rounding at shoulders should increase the density of moiré fringes in that area. Further studies in this area could involve side topographs in the sitting forward bending position, bending in the other direction, side topographs with hands held above the head and side topographs of children in the hanging position. These studies would help improve the existing models of the spinal column.

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<sup>v</sup> Full text: <https://www.ngds-ku.org/Papers/C16.pdf>

<sup>£</sup> Full text: <https://www.ngds-ku.org/Papers/C23.pdf>

<sup>¥</sup> Full Text: <https://www.ngds-ku.org/Papers/C26.pdf>

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<sup>§</sup> Full text: <https://www.ngds-ku.org/Papers/C33.pdf>

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Spinal deformities, especially scoliosis, are a severe problem of the young people. The challenge is to prevent surgical intervention by non-invasive screening programs for early diagnosis, to follow-up the effects of treatment and to predict the course of scoliosis. Optical, acoustical and mechanical techniques have been developed to meet this challenge and to minimize the risk of frequent X-raying. Since 1980 an international group of clinicians, engineers and scientists has met bi-annually to share techniques, results and data on body surface shape and spinal deformities. Digital image processing is providing better means for the three-dimensional description and visualization of the human body. Therefore contributions on surgical planning, implant shaping and reconstructive surgery are included to represent the current state of 3D-medical imaging and visualization in this book.

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