



Osteoporosis in India-Diagnosing in Cost Effective Way- Can Digital X-Ray with Singh's Index Help?

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The Indian Scenario and Osteoporosis

A country of 1.3 billion population with 7.5% (i.e., around 100 million) of it above 65 years. More people added in years to come. 2/3rd of population are from rural background. Forget about advanced health care here, expected primary health care is at minimum and developing state. Mortality rate 46.2 in this age group. Most of the people in this age group die due to unattended health problems [1].

Osteoporosis in India, much of it remains away from screening, diagnosis, treatment. What we see is just like a tip of ice-berg in the sea [2]. Studies done in various parts of India reveal variable prevalence 8.5, 2 to 35 [3]. They also show higher prevalence in post menopausal women i.e., 12 [4] 12.7 [5] 20 [6] and 36.4 [7].

Available Diagnostic Tools for Osteoporosis in India are

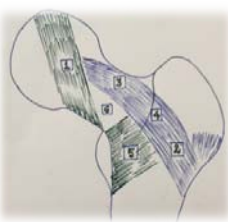
1. Simple X-Ray
2. Digital X-Ray
3. USG examination of BMD of Ankle
4. DEXA Scan
5. Single Slice Cut CT scan of neck of femur

Among these diagnostic tools, the gold standard is DEXA is accepted worldwide. The availability of DEXA Scan is very limited due to only few centers having them. At present at about 200-300 DEXA machines are available in India limiting it 0.2 DEXA scans per million or even lower [6,8]. Many patients cannot afford DEXA scan because it is costly and not covered in many of the health care schemes provided by Government and Private Hospitals. We have to rely on other diagnostic tools that are easily available and cost-effective, though may not be the best diagnostic method for screening the general public.

Digital X-Ray and Singh's Index

Digital X-Ray is available I small towns and free of charge in all Government Hospitals. Hence based on availability and cost effectiveness we propose that digital X-Ray (pelvis with both hips) and evaluation by Singh's Index can help in screening of osteoporosis in Indian Population [9]. Pit falls of using Singh's Index is high intra and inter observer variability, overlapping between the grades of osteoporosis due to trabecular patterns as visible in conventional X-Ray [10]. But the differences appears to be decreased in using Digital X-Ray [11,12]. The evaluation of digital X-Ray with Singh's Index had significant correlation with BMD of DEXA scan [13], with sensitivity of 68.42%, Specificity 83.33% and accuracy of 72%, Singh's Index can be accurate, simple and cost effective method for screening osteoporosis in Indian Population [14].

Figure: Picture Representing the Evaluation of Osteoporosis by Singh's Index [16].

	Grade 1	Major trabeculae are present only at Area 1 Proximal Femur	Osteoporosis
	Grade 2	Some trabeculae are seen in Area 2 also	
	Grade 3	Area 1, 2 and Area 3 also	Osteopaenia
	Grade 4	Area 1,2,3 and Area 4	
	Grade 5	Area 1,2,3,4 and Area 5	Normal
	Grade 6	Additional minor Trabeculae seen in Area 6	
	Grade 7	Dense Trabeculae seen in Area 6	

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Singh et al. [15], proposed that:

1. Trabecular patterns in proximal femur are dependent on bone mineral density of bone i.e., decreased BMD results in decreased or absent trabecular pattern in proximal femur.

2. These findings are correlated with histological findings [15].

The Final Conclusion

Based upon the above information we do infer that digital X-Ray and evaluation with Singh's Index will help in screening osteoporosis in a cost-effective way in Indian Population. Finding osteoporosis in general population helps in preventing the fragility fractures. This may aid in saving socio-economical, emotional constraints in the aging community in India (Figure).

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