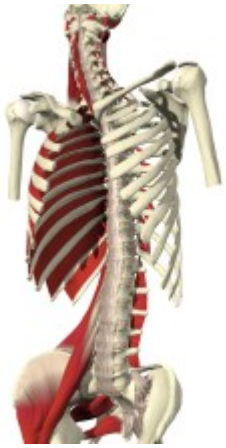
Contents



Introduction
Anatomy Section
Contents Section
MRI Section
Quiz Section
Test Section
Slidebox
Windows Menu
Authors
Acknowledgements
Credits
Technical Specification
Contacting Primal Pictures

Introduction

The Interactive Spine is a complete and accurate anatomical reference - in three dimensions. The CD-ROM goes beyond any traditional textbook. Users can rotate the 3D model on the computer screen, peel away layers, and label any visible feature. A broad selection of anatomical, clinical, and radiological text accompanies the 3D presentation.

The Interactive Spine is an essential tool for use in teaching, in the clinic, and in presentations. As a patient information resource, the CD-ROM has unmatched power to convey anatomical features in a comprehensible format. As a teaching tool, its unique graphic content provides a new and powerful educational resource.

The program splits the disk into five distinct sections, allowing the user quick and easy access to each part. To swap between each section on the disk, click on the named tabs along the top of the main interface. You can also "undock" each section by dragging the tab off the main interface. This allows you to view two or more sections simultaneously, for quick cross-referencing between each part.

Anatomy Section

Contents Section

MRI Section

Quiz Section

Test Section

Anatomy Section

This is the main section of the disk, showing various views of the 3D Model alongside the related text. There are five main views of the model as well as numerous additional views showing separate bones or areas individually, as well as other specialized views, which may not have layer controls.

You can change the view of the model by using the drop-down menu underneath the main image window.

Labeling the 3D Model

Rotation Controls

Layer Controller

Zoom Functions

Text

Labeling the 3D Model

Every visible anatomical structure on the 3D model can be labeled.

Simply use the mouse pointer to click on the structure of interest and the selected structure will be highlighted in a cross-hatch pattern.

Simultaneously, the name of the selected anatomical structure will appear in the box to the right of the model along with its accompanying text.

If you want to track a particular structure between frames, select the Refresh Image Labels When Changing View option in the Preferences (Select Preferences from the Edit menu).

Rotation Controls

The two arrow buttons allow rotation of the displayed model. A single click on either arrow rotates the mode. The direction of the arrow indicates the direction that the model will rotate.

The model can also be set to rotate continuously by clicking on the outer two rotate buttons. To stop continuous rotation, either click again on either central arrow button, or click on the model.

Layer Controller

The layer control allows addition and subtraction of layers of anatomy. The main model contains 22 layers.
Layer 1 displays the bones with bone regions marked in red. Layer 2 displays muscle and ligament attachments, colored in blue and green.
Thereafter, layers of anatomy are superimposed until the superficial layers are reached; at layers 16, 17 and 18. Beyond this there are more layers showing nerves, veins and arteries.
Use the up and down buttons on the slider to add and subtract layers. To jump several layers, either drag the bar along the scroller between the arrows or click on the background of the scroller.

The Deep and Superficial buttons allow the user to jump immediately to layer 1 or layer 16 respectively.

Zoom Controls

Any 3D model image displayed in the image window can be labeled, zoomed, and moved around by toggling the associated buttons detailed below.

To zoom in on the model select the zoom button. To zoom out, simply select it again.

To move a zoomed image place the cursor in the image window, click and hold the left mouse button, and drag the image around.

To label an image at any time, click on the label button.

Text

Every anatomical structure modeled in the Interactive Spine has related anatomical text. This text appears in the text box when a structure is selected either from the Contents or by clicking on the 3D Model. In addition, text will appear for an anatomical structure if it is highlighted on a MRI slice within the MRI window.

There is also Clinical Pathology text on all the major anatomical structures. To select clinical pathology text either scroll down the text box or, using a Right-click use the floating menu to shortcut straight to the text.

If a piece of displayed text is longer than the text box the scroll bar can be used to move the text up and down. Alternatively, the mouse can be used to grab the text and move it up and down.

Clicking and holding the left mouse button grabs the text, which can then be moved. When grabbing the text the cursor changes to a grabbing hand.

Within the text are a number of red words. These text hotspots link to a wide range of slide and video material. When the cursor is positioned over one of the text hotspots it changes to pointing hand.

Next and Previous Buttons

The Previous and Next buttons step you through the list of all the anatomical structures on the 3D model. The entire text contents can easily be browsed, by going through each individual text topic.

These buttons also remember which type of text you are currently viewing and will automatically jump straight to those particular sections within each article.

Text HotSpots

There are numerous hotspots within the text. These show up as red words and provide a link to related material.

Click once on the red word and a popup appears giving a list of the related material.

Select an item from this list, or cancel the popup by clicking anywhere else on the screen.

The type of information presented in the popup selection can be identified by the type of icon accompanying the title: -

Slide

MRI Slide/Sequence

Video Clip

When selecting a text hotspot from a piece of text the slide or video will appear in it's own floating window. You can change the preferences to make each new slide or video be viewed in the same floating window or in a new window for each image.

Slide and Video Window

A number of controls are provided to assist in detailed viewing and labeling.

Labels: Move the mouse over the image and click whenever the pointer changes shape. The label will be outlined and its name will appear in the caption box beneath.

Move: Click and drag to move the image around the screen.

Zoom: Left-Mouse Button click - Zoom In; Right-Mouse Button click - Zoom Out

Reset Zoom: This resizes the image to fit the size of the labeling window.

Label List: This buttons shows a complete list of labels on each image.

Contents Section

The Contents window pulls up the main navigation tool for the disk. Within this window the user can toggle between the three sections by selecting either the Search, Browse or Context tabs in the top control bar. The working of each of these sections is explained below.

The Contents window can be undocked from the main interface to allow the user to jump quickly between different parts of the contents. To keep the undocked Contents window from disappearing behind the main interface when you choose an item from it, click on the Pin button.

Search

Browse

The buttons in the bottom left corner of the window change how the results are displayed.

Thumbnails only

Titles and Thumbnails

Titles only

Search

This function allows the user to search for any label or topic title contained within the disk. The Search can be set to one of the following parameters allowing the user to search the entire content of the disk or just a specified type of resource:

- Everything
- Anatomy Text
- Clinical Pathology Text
- Cadaver Slides
- Clinical Slides
- Dissection Slides
- Illustrations
- MR Slides
- Surface Anatomy Videos

Type in a word or short phrase to search for, select a choice of category from the above list and click on the Find button. Search results are displayed in the window below.

The Search works using a Boolean AND: in other words, it will look for all the separate terms you specify. If it returns no results, try reducing the number of search terms. For instance, if "*dorsal third ligament*" does not find the required item, try just "*dor lig*".

To view an entry from the list, either double click on the entry or click on it once followed by the OK button.

Browse

These options allow you to browse the entire disk in alphabetical order. Each section of the disk is displayed within its own folder, much like the Windows file system. Simply double-click on each folder to open it and view its contents.

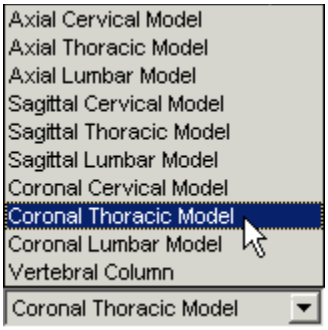
Use the Close Folder icon to close each folder;

Use the Top Level icon to go back to the start again.

Once you have chosen any item the Links button becomes available. This allow you to see every article that has links to that particular image or video. The links for each image and video appears under the Context tab.

MRI Section

This section shows three orthogonal views through the Spine 3D Model, alongside a complete set of axial, coronal and sagittal MRI slice data.



This drop-down menu allows you to choose up to 10 different views of the spine. There are 3 orthogonal views, each of the Lumbar, Thoracic and Cervical areas of the Spine, as well as a view of the Vertebral Column

The left and right arrows at the lower left of the MRI screen can be used to move forward or backwards through the MRI slices. As this is done the sliced 3D model will automatically update, keeping in step. In this way the user can compare related axial, coronal, or sagittal MRI data with the sliced 3D model data.

You can also either click and hold, or press Ctrl+click on either of these buttons to play the MRI set back as a continuous sequence. To stop this continuous play, release the button or click on the MRI image.

This button shows the equivalent 3D model slice for the current MRI image.

This button finds the equivalent MRI image for the current 3D model view.

Labeling the MRI slices

The majority of anatomical structures on the MRI slices can be labeled by clicking on them. This will highlight the structure on the MRI and on the sliced model, if visible. In addition, the text will update to display narrative related to the selected structure.

The MRI window is also undockable and hence can be dragged off and resized.

Quiz Section

This section allows you to test yourself on your knowledge of the Spine. You can set the quiz to test you on different layers, different types of question and two different grades of difficulty. The hardest grade of question requires you to navigate to an appropriate image if asked to locate a structure.

After setting up the quiz and choosing the total number of questions you wish to face, press the Start Quiz button and away you go.

A score is kept of all your correct and incorrect answer and a summary of this is shown at the end.

The Quiz that you are presented with is randomly generated. There is an option to do a Preset Quiz, using a pre-built Quiz file. You are able to download a Quiz Builder program from the Primal Pictures website, www.primalpictures.com.

Test - Multiple Choice Questions

This section of the disk allows you to test yourself using standard multiple choice questions.

This button starts the multiple-choice test. The questions appear in the form of an initial statement, followed by up to five optional statements. You must mark which statements are true and which are false.

At any time during the test you can choose to have your answers checked.

Use these three buttons to mark an answer true, false or pass. If you cannot decide, you can leave the answer blank, but this will be deemed to be an incorrect answer.

There is an option to Load an external MCQ file. More complex multiple choice quizzes will be available later, as well as a Multiple Choice Quiz Builder program, which can be downloaded from our website, www.primalpictures.com

Slidebox

The Slidebox function enables you to create, save and play back a series of images or video clips for the purposes of teaching and revision.

To open the Slidebox click the Open option in the Slidebox menu.

The Slidebox is composed of three sections: the editor, viewer and slideshow.

The tabs along the top of the Slidebox window allow you to toggle between these three sections.

Slidebox Editor

Slidebox Viewer

Slide Show

Slidebox Editor

Any image or video clip display in the main interface can be added to the Editor. This can be accomplished in two ways:

1. Use the Add Image to Slidebox option from the Slidebox menu. This will add the currently visible image into the Slidebox, along with any label that's highlighted on it.

2. To add an image or video clip from the main interface, simply click on the Add button on the left of the Editor window. This will add whatever the last focused image into the Slidebox, whether it was a movie, a 3D model slide or a MRI image.

You can only add new items into the Slidebox when it is in the Editor mode.

A number of controls within the Slidebox Editor mode allow you to reorder, duplicate and delete images in the Slidebox.

Select an image and use these buttons to change its position in the slidebox. You can alternatively use drag and drop functions to change the order of the images in the slidebox. Use CTRL and SHIFT to alter the selection.

This button will delete the selected image from the slidebox.

This button will make a copy of the selected image into the slidebox.

These two buttons along the bottom of the window allow you to choose how you wish to display the selected images in the Editor.

Thumbnails only

Thumbnails and title

Slides within the Editor can be viewed either in the Slidebox Viewer or the Slide Show

Slidebox Viewer

The Slidebox Viewer displays the slides in the order determined within the Editor. A number of controls are included in the Viewer.

Labels: Move the mouse over the image and click whenever the pointer changes shape. The label will be outlined and its name appear in the caption box beneath.

Move: Click and drag to move the image around the screen.

Zoom: Left-Mouse Button click - Zoom In; Right-Mouse Button click - Zoom Out

Reset Zoom: This resizes the image to fit the size of the labeling window.

Labels: Displays all the labels on each image in a floating window. Select a label from the list and the related region will be highlighted on the image.

These buttons allow the previous or next slide to be displayed

Slide Show

The Slide Show mode of the Slidebox displays the selected slides in a full screen format against a black background.

Labels appear below the image displayed. The order in which the slides and video clips are is determined by the order set in the Editor. There are several options available in the Slide Show. To display the next slide in the sequence use the right cursor key; to select a previous slide use the left cursor key.

To close the Slideshow and return to the Editor mode press ESC or click on the Close Window button in the top right-hand corner.

Slidebox Menu

The Slidebox has its own Windows Menu Bar containing three menu options:

File	
Print Image	Print the current visible image.
Exit	Closes the current Slidebox

Edit	
Copy Image	Copy the current visible image to the computers Clipboard.
Save Image to Disk	Save the current image onto your harddisk in bitmap format.

Action	
Run Slidebox	View the Slidebox
New Slidebox	Creates a new Slidebox
Merge Slidebox	Merges two or more pre-saved Slideboxes
Load Slidebox	Opens an existing Slidebox
Save Slidebox	Saves a current Slidebox to disk

Spine Menu

The Interactive Spine has five menus: File, Edit, Slidebox, Windows and Help.

File Menu
Edit Menu
Slidebox Menu
Window Menu
Help Menu

File Menu

Menu Option	Description
Print Setup	Use Print Setup on the File Menu to set your printing preferences such as which printer, number of copies, etc.
Print Image	Print either the 3D Model or the MRI image. The second option is only available when the MRI section is visible.
Print Text	To print the text for a particular structure - locate and click on it, and then select Print Text from the File menu.
Exit	Exit Interactive Spine.

Edit Menu

Using the Edit Menu you can copy text or images to the Clipboard, you can then paste the article or image into a word processor or presentation program, or you can set the program preferences

Menu Option	Description
Copy Image	This will copy either the 3D Model or the MRI image to the computers clipboard. The second option is only available when the MRI section is viewable.
Copy Text	To copy the text for a particular structure - locate and click on it, then select Copy Text from the Edit menu.
Save Image to Disk	This will save a copy of either the 3D Model or the MRI image to your hard disk. The image will be saved as a Bitmap and you can then use it in any image manipulation program, for instance Paint.
Preferences	The Preferences panel allows program settings to be modified.

Preferences

Button Sounds On/Off Turn the button sounds on and off

One Labeling Window Turn this off and you will get multiple windows to view images in.

Show Image Tools This will remove the zoom and move controls from the interface.

Refresh Image Labels When Changing View

This option will ensure the chosen label will remain highlighted as you alter the view of the model

Show Popup Image Labels This option brings up a popup label identifying the underlying anatomy as the mouse moves over the 3D model.

Short Timer Interval Rotates the 3D model on a "fast" setting.

In addition, the preferences menu allows you to determine the colors of the label cross-hatching for anatomical structures on the 3D model.

Slidebox Menu

A Slidebox function has been included in the Interactive Spine enabling you to create, save and play back series of images for the purposes of teaching and revision.

Slidebox files may be saved to disk for later use, but will only work in conjunction with the program.

The Slidebox menu contains the following options:

Add to Slidebox...	This will add either the current 3D Model or the MRI image to the Slidebox. It also adds any highlighted label to the Slidebox too.
Open Slidebox Editor...	Opens the Slidebox Editor.(see the Slidebox Editor)

Windows Menu

Each of the five main sections have their own windows which can be docked and undocked from the main interface. You can also click and drag each separate window off the main interface by dragging the tab above or below the docked position. To redock them, either use this menu option again or use the Close Window button.

The Windows menu has the following options:

Undock Anatomy...	Undock the Anatomy section from the main interface.
Undock Contents...	Undock the Contents window and show it as a floating window.
Undock MRI...	Undock the MRI section from the main interface.
Undock Axial slice...	Undock the separate MRI window from the MRI section.
Undock Quiz...	Undock the Quiz section.
Undock Test...	Undock the Multiple Choice Question section.

Help Menu

Interactive Spine	Shows this Help File.
About...	Program information and version number.

Authors

HILALI NOORDEEN, Consultant Orthopaedic Spine Surgeon,
The Royal National Orthopaedic Hospital, London/Stanmore;
The Children's Hospital, Great Ormond St, London, UK.

HAZEM ELSEBAIE, Consultant Orthopaedic Spine Surgeon,
The Royal National Orthopaedic Hospital, London/Stanmore;
The Children's Hospital, Great Ormond St, London, UK.

ALAN CROCKARD, Professor of Surgical Neurology (U.W.A) and Consultant Neurosurgeon,
The National Hospital for Neurology and Neurosurgery, Queens Square, London, UK.

ROBERT WINTER, Clinical Professor of Orthopaedic Surgery,
University of Minnesota, Minneapolis, MN, USA;
Research Consultant, Twin Cities Spine Center, Minneapolis and St. Paul, MN, USA.

JOHN LONSTEIN, Clinical Professor of Orthopaedic Surgery,
University of Minnesota, Minneapolis, MN, USA;
Consultant Orthopaedic Spine Surgeon and Medical Director of Research,
Twin Cities Spine Center, Minneapolis and
St. Paul, MN, USA.

BEN TAYLOR, Consultant Orthopaedic Spine Surgeon,
The Royal National Orthopaedic Hospital, London/Stanmore;
Neuro-orthopaedic Spinal Service, Wellington Hospital, London, UK.

ROGER SOAMES, Senior Lecturer in Anatomy,
Leeds University, UK.

PETER RENTON, Consultant Radiologist,
The Royal National Orthopaedic Hospital, London/Stanmore, UK.

STEWART TUCKER, Consultant Orthopaedic Spine Surgeon,
The Royal National Orthopaedic Hospital, London/Stanmore;
Neuro-orthopaedic Spinal Service, Wellington Hospital, London, UK.

JOSEPH CRISCO, Associate Professor,
Department of Orthopaedics and Division of Engineering,
Rhode Island Hospital, USA.

Acknowledgements

Primal Pictures would like to thank the following people for their help during the production of the Interactive Spine:

Vishy Mahadevan, MBBS, PhD, FRCS
Reader in Anatomy
Royal College of Surgeons of England

Greg Etherington
Royal National Orthopedic Hospital, London and Stanmore
Great Ormond Street Hospital, London

Alex Webb BSc Mchiro, Lecturer & Guy Gosslin, D.C. Senior Lecturer
Anglo-European College of Chiropractic
Bournemouth
Dorset

Veronika Aurens BA
Royal National Orthopedic Hospital, London

Lester Wilson
The Wellington Hospital, London

All staff at the London MRI Center
London Bridge Hospital, London

Tim Regan
Philips
The Observatory, PO Box 263, Castlefield Rd Reigate, Surrey, RH2 OFY

Dr. Johannes Willnecker
Stratec Medizintechnik
Durlacher Str. 35
75172 Pforzheim
Germany

Prof. Judith Adams
Department of Clinical Radiology
Manchester University
Manchester

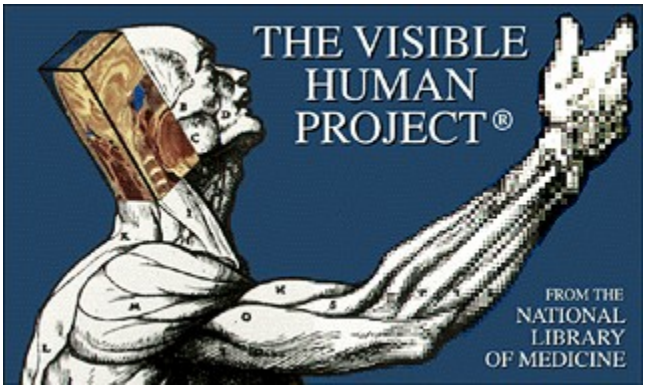
BrowseDR component
Copyright ©1999, Brad Stowers
All Rights Reserved.

LibPNG, www.cdrom.com/pub/png/, for PNG format read/write routines

Jean-Loup Gailly and Mark Adler for ZLIB general purpose compression library

Waldemar Celes, Roberto Ierusalimschy and Luiz Henrique de Figueiredo at TeCGraf, PUC-Rio for LUA programming language

This software is based in part on the work of the Independent JPEG Group.



Credits

Managing Director

Laurie Wiseman

Project Manager & Editor

Pippa Chadfield

Anatomical & Editorial Assistants

Sarah Hopper

Jose Barrientos-Cordova

Nurul Basher

Head of Programming

Michael Porter

Senior Programmer

Raymond Ko

Additional Programming

Allan Chaplin

Creative Director

Chris Briscoe

Head of Graphics

Simon Barrick

Lead Artists

Joe Barrow

Richard Wilson

Giles Lord

Senior Artists

Nik Clifford

Artists

Bridget Dexter

Fiona Morgan

Jamie Stewart

Christiaan Jones

Eve Khambatta

Technical Specifications

The Interactive Spine v1.0 CD-ROM for PC has the following minimum requirements:

Pentium or equivalent processor;
32 MB Ram; 16-bit or Hi Color display.
Windows 95, 98, NT 4.0 or 2000

Primal Pictures

Primal Pictures Ltd.
Tennyson House
159-163 Great Portland Street
London W1W 5PA
UK

Telephone: +44 (0)20 7637 1010
Fax: +44 (0)20 7636 7776

email@primalpictures.com

Technical Support
support@primalpictures.com
+44 (0)20 7637 1010

www.primalpictures.com
www.anatomy.tv