

7ULSOH \$QWLWKURPERWLF 7KHUDES\ LQ 3DWLH  
3&, \$GHTXDWL 7LPH LQ 7KHUDESXWLF ,15 5D

+LURND]X .RQ.DWKLXPL .RQ.DWKLXPL LUR\XNL 'DLGD  
'HSDUWPHQW RI &DUGLRORJ\ -XQWHQGR 8QLYHUVLW\ 6KL]XRND +RVSLWDO 6KL]XRND -DSDQ  
'HSDUWPHQW RI &DUGLRORJ\ -XQWHQGR 8QLYHUVLW\ 6FKRRO RI 0HGLFLQH 7RN\ -DSDQ  
&RUUHVSRRGLQ.DWKLXPL\DXFKL 'HSDUWPHQW RI &DUGLRORJ\ -XQWHQGR 8QLYHUVLW\ 6FKRRO RI 0HG  
)D[ NWDLO#PHG MXQWHQGR DF MS

5HFHLYHG\$SDWQ \$FFHSWHG0GDWH 3XEOLVKHG GDWH 0D\  
&RSULJKW .RQLVKL + HW DO 7KLV LV DQ RSHQ DFFHVV DUWLFOH GLWULEXWHG XQGHU WKH WHUPV R  
XVH GLWULEXWLRQ DQG UHSURGXFWRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXU  
0LQL 5HYLHZ

'XDO DQWL SODWHOHW WKHUES\ '\$37 LV D VWDQGDUG SURFHGXUH IRU  
SDWLHQWV XQGHUJRLQJ SHUFXWDQHRXV FRURQDU\ LQWHUYHQWLRQ 3&, XVLQJ  
VWHQWV > @ ZKHUHDV RUDO DQWLFRRDJDWLRQ 2\$& LV QHFHVVDU\ ZKHQ  
&+\$'69\$6F VFRUHV DUH<sup>a</sup> WR UHGXFH VWURNH DQG HPEROLF HYHQWV LQ  
SDWLHQWV }ZLW 0DWHU@ &RURQDU\ DUWHU\ GLVHDVH  
&\$' DQ RSHQ [LVWV LQ VDPH SDWLHQW DSSUR[LPDWHO\ RI  
SDWLHQWV ZKR XQGHUZHQW 3&, KDYH \$) > @ 6RPH VWXGLHV KDYH  
UHSRUWHG WKDW '\$37 ZLWK 2\$& WULSOH DQWLWKURPERWLF WKHUES\ >77@  
UHGXFHV PDMRU FDUGLRYDVFXODU HYHQWV DQG PRUWOLW\ FRPSDUHG ZLWK  
'\$37 RQO\ LQ SDWLHQWV ZKR XQGHUZHQW 3&, ZLWK \$) > @ 2Q WKH  
RWKHU KDQG RWKHUV KDYH IRXQG WKDW 77 LQFUHDVHV WKH EOHHGLQJ DQG  
FDUGLRYDVFXODUHHFHQW >RSW@ FRPELQDWRQ  
DQWLWKURPERWLF WKHUES\ IRU WKH SDWLHQWV ZLWK \$) XQGHUJRLQJ 3&, LV  
XQFHUWDLQ

H \$PHULFDQ &ROOHJH RI &KHW 3K\VLFLDQV \$&&3 JXLGHOLQHV  
UHFRRPHQGHG 77 HJ 2\$& DVSLULQ DQG FORSLGRJUHO IRU SDWLHQWV ZLWK  
\$) &+\$'6VFRUH RI RU JUHDWHU ZKR XQGHUJRLQJ 3&, GXULQJ WKH  
>UFRQDWH\ DDFHPHQW RI D \$DWHU@ DQWLRQW RU  
DVH\ DDFHPHQW RI D \$UW\ KLOXWQD\ DQWLRQW RI 77  
2\$& SOXV D VLQJOH DQWLSODWHOHW GUXJ LV UHFRRPHQGHG \$W PRQWV  
DVH\ , 2\$& DORQH LV VXJJHVWHG DV IRU SDWLHQWV ZLWK \$) DQG &\$'  
\*UDGH & H> @ (XURSHDQ 6RFLW\ RI &DUGLRORJ\ (6&  
JXLGHOLQHV UHFRRPHQGHG & JXLGHOLQHV  
&\$' DQG DFXWH FRURQDU\ \IQGURPH ZLWK KLJK EOHHGLQJ ULVN RU  
PRQWV , DFXWH FRURQDU\ \IQGURPH ZLWK ORZ EOHHGLQJ ULVN  
\$VHWKDW UHFRRPHQGDWRQ RI DQWLWKURPERWLF WKHUES\ ZDV VDPH DV WKH  
\$&&3 JXLGHOLQHV FODVV ,,D HYLGHQFH OHYHO % RU & > @ :KHQ D  
GLUHFWRU RUDO DQWLFRRDJDW '2\$& LV XVHG DV IRU 2\$& WKH FRQVHQVXV  
UHFRRPHQGDWRQ LV HWKDW LW ORZHU\ VSU\ FRQWLRQ  
LQ \$) VKRXOG EH FRQVLGHUHG

5HFHQWO\ '2\$& LV EURDGO\ XVHG DV IRU 2\$& LQVWHDG RI YLWDPLQ .  
DQWDRQLVP 9.\$ LQ SDWLHQWV ZLWK \$) DQG YHQRXV WKURPERHPEROLVP  
+RZHYHU WKH SDWLHQWV RI FKURQLF NLGQH\ GLVHDVH KLJK DJH DQG OHDQ GR  
QRW KDYH WKH DGDSWDLRQ RI '2\$& \$PRQJ WKH SDWLHQWV ZLWK \$) ZKR  
XQGHUJRLQJ 3&, WKH SDWLHQWV ZKR GR QRW KDYH WKH DGDSWDLRQ RI  
'2\$& DUH QRW D OLWWHO DQG WKHVH SDWLHQWV QHGH WR XVH 9.\$ DV IRU 2\$&  
'HUHRRH RI FULWLFDO LVVXH RI 77 LV VWLOO XQFOHDU UHJDUGLQJ  
DSSURSULDWH UDQJH RI LQWHUQDWRQDO QRUPDOLJHG UDWR RI SURWKURPEL  
WLP 37 ,15 ,Q SDWLHQWV ZKR UHFHLYH 77 WKH UHFRRPHQGHG UDQJH  
IRU WKH 37 ,15 YDULHV EHWZHHQ DQG LQ WKH (6& JXLGHOLQHV FODVV  
,,D HYLGHQFH OHYHO & > @ DQG EHWZHHQ DQG LQ WKH \$&&3  
JXLGHOLQHV JUDGH & > @ +RZHYHU D 37 ,15 YDOXH XVLQJ 77 KDV QRW  
EHHQ HVWDEOLVKHG \$Q RSHQ ODEHO PXOWLFHQWHU UDQGRPLJHG FRQWUROO  
WULDO :2(67 WULDO Æ€HYHU HHQ@Æ€ UDQGRKH%`0qp

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